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The Edward Stirling Lectures.[1]

II. THE NATURAL HISTORY OF TUBERCULOSIS.

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TUBERCULOSIS is still the most humanly important of the infectious diseases. It is the only major disease which in communities like our own kills predominantly in the prime of life.

Tuberculosis is a subject in which the public is keenly interested, and to judge by experience in parts of Canada and the United States, general cooperation in positive measures to eliminate tuberculosis can be looked for. There is a considerable body of public health opinion which claims that it is a practicable proposition to eliminate tuberculosis completely within a generation.

In many ways this lecture can be regarded as an attempt to assess the justification of this claim in the light of what is known about the natural history of tuberculosis as it occurs in civilized communities of temperate climates. The discussion will be hampered, as all similar discussions are hampered, by the fact that relatively accurate statistics of the disease are available only for deaths. The changes in mortality rate over the last eighty or one hundred years are plain to see, and the current incidence of fatal disease in regard to age, sex, occupation *et cetera* is available in detail. But the interpretation of the processes of infection and of manifest disease must be made from the data of very restricted samplings of some populations.

Bovine tuberculosis cannot yet be safely forgotten; but in Australia nowadays it is of minor importance, and in this lecture I shall be concerned only with tuberculosis due to the human type of bacillus. This is a disease which for all practical purposes affects only human beings and is derived only from other human beings.

Clinically, tuberculosis differs from most of the common epidemic diseases by its chronic character, and epidemiologically it has several important features of distinction. Perhaps I may forestall some of my conclusions and make the discussion easier to follow if I state at once the essential features of the epidemiology of human tuberculosis. (i) The infecting organism varies little in virulence. (ii) The commonest result of infection is a trivial pulmonary lesion, which heals without serious sequelæ and leaves an increased resistance to any subsequent infection. (iii) A proportion of infected individuals (determined more by genetic than by any other factors) develop more serious lesions, from which tubercle bacilli are liberated into the environment. (iv) It is from these individuals that infection of others occurs. Any attempt at prevention or elimination of the disease must be based on these four principles.

The Pathogenesis of Pulmonary Tuberculosis.

We may first consider what happens in the standard episode of tuberculosis infection—when a child, say, of eight or nine years, as a result of exposure to a tuberculous sufferer, develops infection manifested by the appearance of a positive response to the tuberculin skin test, but without manifest symptoms or sequelæ.

Despite the earlier theory popularized by Calmette that the main route of primary infection was by the intestinal tract, it is now accepted that the great majority of infections by the human type of bacillus and a significant number of bovine type infections take place by the respiratory route. Bacilli, carried presumably on droplets of sputum or on dust are inhaled and lodge in the lung. It is probable that only a relatively small proportion of the bacilli that are inhaled find an opportunity to initiate an infection, for it is much commoner to find radiological evidence of only a single primary focus than of multiple

[1] Delivered on August 26 and 28, 1947, at Adelaide.

foci, even when the subject has been exposed to massive infection.

When infection does occur, a so-called primary complex develops rather rapidly. The primary complex—essentially a radiological conception—consists of a proliferative lesion in the lung around the point at which infection is initiated, with an associated specific infection and enlargement of the corresponding bronchial lymph nodes. Within a few weeks of infection allergy to tuberculin appears. As a rule the reaction to the Mantoux or similar test is strongly positive when it is first recognized as positive at all. When primary infection of this sort takes place in a child, the usual sequence is a relatively mild febrile illness lasting a few days and not infrequently associated with *erythema nodosum*. This appears at about the time allergic sensitization develops and is essentially a manifestation of this. Radiological demonstration of a primary complex may be possible. Clinical recovery is complete and any radiological shadows contract over the years; cutaneous reactivity probably persists for life, but normally falls to a lower level of intensity. Any further manifestation of tuberculosis, if it occurs, is normally deferred until adolescent or adult life.

During the primary phase of infection spread along lymph channels in invariable, and in all probability a certain degree of invasion of the blood-stream occurs almost regularly. This may give rise to generalized tuberculosis or tuberculous meningitis or to some limited localization of infection. The commonest, according to Wallgren, is secondary hæmatogenous lung infection. The earlier in life that primary infection occurs, the more likely is fatal generalization to occur. Tuberculous meningitis, like most other forms of meningitis, is characteristically a disease of infancy.

Once the process of primary infection has occurred and allergy to tuberculin has developed, the child probably retains a heightened resistance to infection from outside sources for a prolonged period, perhaps for life.

There is a sharp difference of opinion as to the source of the infection that produces clinical pulmonary tuberculosis, say, in a young woman known to have become a positive reactor to tuberculin during childhood. As yet there is no way of "tagging" strains of tuberculosis as we can streptococcal strains, so that indirect evidence only can be sought. Wallgren and others believe that the development of phthisis during adolescence or adult life is due to the activation of endogenous infection acquired at the time of primary infection (often in childhood), and not to new exogenous infection. Their teaching is that the phthisical process starts not from the primary complex, but from residues of pulmonary lesions mostly near the apices due to early secondary (blood) spread.

There is, however, a good deal of evidence that a single primary infection in childhood may heal completely and the bacilli be eliminated, with eventual disappearance of the positive reaction to the Mantoux test. Such individuals may well be expected to have only a minor degree of acquired resistance and hence to be liable to reinfection when heavily exposed in early adult life. In a community like our own, the problem of what happens in the person primarily infected in childhood is becoming much less important than it was in the past. As I shall show later, primary infection occurs now predominantly in adolescent or adult life, and there seems to be very little controversy on the point that once infection has occurred in such older individuals, the subsequent development is almost uninfluenced by later exposures to infection.

If we accept this reading of the relative importance of exogenous and endogenous reinfection in determining the occurrence of clinical pulmonary tuberculosis, two important problems are immediately presented: (i) What are the conditions governing the occurrence of primary infection with the tubercle bacillus? (ii) What are the factors which determine the activation of a latent infection implanted a variable time (up to many years) previously?

Primary Infection with the Tubercle Bacillus.

Most primary infections with the tubercle bacillus are subclinical, producing trivial or no symptoms, just as is the case with most infections by the diphtheria bacillus. There is, however, a rather important difference. In the case of diphtheria it is probable that most subclinical infections are derived from similar silent infections. In the case of the tubercle bacillus, however, there is no doubt whatever that the main source of infection is the person with active pulmonary tuberculosis. This fact must be constantly borne in mind, because around it centres all the hope of doing anything effective toward the prevention of tuberculosis.

The only practical way of deducing the fact of primary infection in a given individual is by the use of the Mantoux or some equivalent test. It must be admitted at once that all such tests are liable to error and misinterpretation. Ideally, we can obtain an accurate idea of the tuberculin sensitivity of a person only by carrying out a full series of tuberculin tests at graded dilutions and at the same time carrying out some non-specific test to assess the general reactivity of his skin. A young child, for instance, is less non-specifically reactive than an adult, and may give no reaction to a 1:10 dilution of tuberculin, although this will almost always produce a non-specific reaction in an uninfected adult. However, in practice the use of a single dilution, usually 1:10,000 of purified protein derivative or 1:1000 of old tuberculin, will give valuable data both in regard to the individual and in regard to the community. When due allowance is made for the limitations of the test, the main features that have been revealed by surveys of child, adolescent and adult populations for cutaneous reactivity to tuberculin are as follows: (i) Home contact with a known sufferer from tuberculosis is the most potent of all factors in producing infection. (ii) The rate of infection is lower in country than in urban areas. (iii) In communities of low standards of living the rate is higher than in those of high standards. (iv) In Australia, the United States and some European countries (before the war) there has been a pronounced decrease in the rate of infection during the last twenty to thirty years.

Of these points the first can be seen very clearly in any figures for the proportion of reactors in families having a member with active tuberculosis as compared with the proportion in the general population. Anderson's figures from a survey of Sydney in 1938 showed in the age group ten to fourteen years 21·7% of reactors in the general population, but 62·1% amongst contacts.

The influence of poverty and of urban as against country life can be seen well if the results obtained in surveys of tuberculosis in Jamaica by Flahiff and others are compared with those, say, in Sydney.

With the increased admission to hospital of the tuberculous and higher standards of hygiene in the community, opportunities for primary infection have diminished steadily during the last thirty years, and the average age of primary infection has risen greatly. Particularly among persons of upper social levels or among those who have been brought up in the country, it is now common to reach adult life without having experienced infection. Among nurses entering the Royal Melbourne Hospital, for instance, there are only 25% who react to the Mantoux test.

As far as the immediate effect of infection is concerned the influence of age can be expressed somewhat as follows: the younger the child at the time of primary infection, the greater the likelihood of extensive generalization and of death from tuberculous meningitis. The peak of mortality from tuberculosis in childhood is in the first and second years, and from this the level falls rapidly, then more gradually to reach a trough at ages nine to twelve years. When primary infection occurs after puberty it is usual for there to be a complete absence of clinical signs of infection; but there is a significantly greater proportion of early secondary and tertiary developments.

The Influence of Age of Primary Infection on the Outcome.

If the relative unimportance of reinfection by the tubercle bacillus is accepted, then it becomes of very great importance to know whether the age at which primary infection occurs in itself has any important influence on the outcome. Is there, in other words, an age at which it is most desirable to be infected if we have to be infected? The evidence available is mostly indirect, but it does indicate rather strongly that there are ages at which people are more likely, and others at which people are relatively less likely to suffer severe secondary complications of primary infection. As far as I am aware there is no evidence to indicate that one age is more susceptible to primary infection as such than another; the differences concern only the sequelæ of infection. On general grounds one would assume that all other things being equal, the chance of becoming infected by inhalation of a single uniform dose of tubercle bacilli would, on the whole, diminish with increasing age. The most important relevant data at present are those obtained from surveys of entrants to the nursing or medical professions. It is possible to obtain extensive figures showing the proportions of reactors and non-reactors at the time of entry (ages around eighteen to twenty years) and the proportion of each group which develop clinical tuberculosis during their three years' training.

The most recent and extensive of such studies has been the Prophit survey of nurses in England covering some 3764 entrants to the nursing profession. Of these, approximately 80% were Mantoux reactors when first examined, the proportion rising with age—73% in seventeen year old girls to 81% in those aged twenty to twenty-five years and 89·8% in those aged over thirty years. In hospitals with a considerable number of tuberculosis patients, nurses not reacting to the Mantoux test rapidly become reactors—78% by the end of their first year, 86% at the end of three years. Of 285 persons showing a change from no reaction to a reaction, more than 200 showed no clinical evidence of illness, and only 19 showed X-ray evidence of a primary lesion. It may be noted here that these figures are by no means applicable to Australian conditions. Entrants to the Royal Melbourne Hospital during the last three years have shown only 25·3% of reactors, and the rate of change from non-reactor to reactor has been only about 14% *per annum*.

There is quite regularly a higher morbidity amongst nurses entering their profession uninfected (that is, not reacting to the Mantoux test) than amongst those who have been infected earlier and yield a positive skin reaction.

The figures from the Prophit survey show that amongst 452 entrants initially not reacting, 33 (7·2%) developed clinical or radiological evidence of tuberculosis, while 2120 entrants initially reacting 43 (2·0%) gave evidence of disease by the same criteria. A further analysis indicated that in the first group (not previously infected) 9·0 cases of clinical phthisis developed per 1000 *per annum*, while in the group initially reacting the figure was 4·6 cases per 1000.

The figures from other such investigations show consistently that tuberculosis morbidity is lower in those initially reacting than in those initially non-reacting. In the combined figures for investigations from 1933 to 1944 covering 15,000 entrants, reactors had a 2·1% morbidity, non-reactors a 5·8% morbidity. In the Prophit survey it was found that the morbidity amongst the nurses who changed from non-reactor to reactor during their training was particularly high during the first year after the change and thereafter became progressively less frequent.

All that can be drawn from these findings is that it appears to be safer for a girl to become infected with tubercle bacilli before the age of eighteen years than between the ages of eighteen and twenty-five years. In support of this indication that it is unduly dangerous for a woman to become primarily infected at this period is the fact that, despite the general reduction in tuberculosis mortality, there is still in most countries (including Australia) a proportionately higher death rate in young women than in other groups. It is of much interest that the most recent figures from the United States show that this peak has almost disappeared amongst white females, though it is still evident in Negroes. Since in Australian cities nowadays most primary infection takes place after school age, it is hard to avoid the tentative conclusion that the age of twenty to twenty-five years is particularly unfavourable for primary infection. There is practically no evidence as to whether this holds to any extent in regard to males; but it is certain that if there is such a phase of vulnerability it is much less important than in females. The significance of the very important prevalence of fatal pulmonary tuberculosis in men beyond middle life is obscure. Occupational factors probably play a predominant part.

Closely related to the question of the most favourable age for primary infection is the problem of whether the current process of decreasing morbidity and mortality from tuberculosis is running merely parallel with the diminution in the numbers of primary infections, or whether there is in addition a real decrease in the proportion of primarily infected persons who develop clinical tuberculosis. From the fact that the morbidity in the early age group, particularly amongst women, has not fallen so rapidly as in other age groups, it would not be surprising to find that there had been a considerable increase in the proportion of clinical to primary infections at this age period. A thoroughly scientific policy for the control of tuberculosis can be formulated only when these quantitative relationships between primary infection and clinical disease have been clarified.

The Influence of Dose and Strain of Bacilli Received at Primary Infection.

The influence of dose and strain of bacilli received at primary infection is a question that might be discussed at some length, because there is little doubt that in most acute infectious diseases dose and strain play a considerable part in determining the outcome of infection. There is no direct evidence of much significance from human experience, but it seems to be legitimate to assume with some confidence that differences in virulence of the strains of tubercle bacilli concerned in human infection are trivial. The effect of dosage is more controversial.

The general opinion, based largely on Ghon's demonstration of the single character of the primary lesion, is that dosage of tubercle bacilli in the primary infection is relatively unimportant. Only those bacilli which induce actual infection are of any significance to the individual, and the general impression is that it is extremely rare for more than one lesion to be initiated in the lung at the time of primary infection. Once allergy has been induced, the lung is said by most authorities to be immune to fresh infection. On general immunological grounds this is probably a gross over-simplification. It is probable that the existence of a tuberculous focus initiates an immunological process which significantly reduces the chance that inhaled tubercle bacilli will find an opportunity to produce a lesion. It is still uncertain whether this resistance lasts only while there are living tubercle bacilli in the tissues, or whether it can persist long after all living tubercle bacilli have been eliminated. In the ordinary circumstances of civilized existence, a person who has been once infected with tubercle bacilli has certainly less to fear from contact with tuberculosis than one who has never been infected. This does not mean either that we know the mechanism by which this protection is induced or that in the circumstances of human catastrophe the protection may not break down completely.

Factors Responsible for the Development of Pulmonary Tuberculosis.

The second great problem in tuberculosis is to evaluate the factors which are responsible for the development

of pulmonary tuberculosis in persons who have been the subject of primary infection. A *prima facie* case can be made out for the importance of two major sets of factors: (i) genetic constitution; (ii) environmental conditions, of which the most important are climate, occupation and nutrition. Before I discuss the relative importance of these factors, it is advisable to give a brief summary of the age and sex mortality from tuberculosis in typical civilized communities. Figure I shows the age and sex incidence of fatal tuberculosis (all types) for England and Wales and for Australia in 1934. It shows several features common to almost all such tabulations. There is first the high mortality rate in the first years of life followed by a negligible mortality rate over the decade from five to fifteen years. The death rate rises very sharply in adolescence, earlier and to a higher peak in women than in men. After reaching its maximal rate in women aged between twenty years and twenty-five years, the rate falls steadily thereafter. Men, however, show two peaks—one in early adult life corresponding to

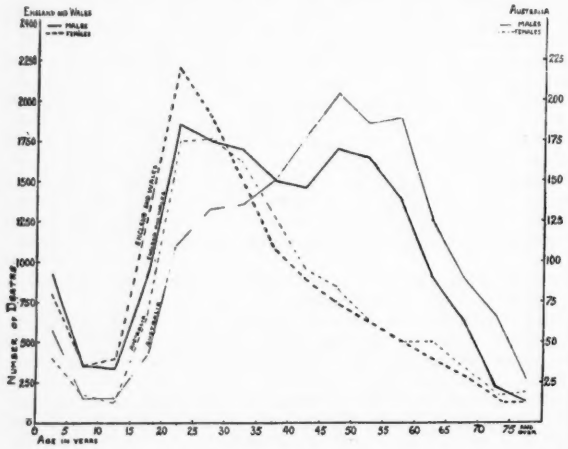

FIGURE I.

the female peak, and a second almost as high between the ages of forty and forty-five years. The total mortality falls more heavily on the male than on the female sex.

Australian experience differs somewhat from that shown in the English graph. In the first place, in this country infantile tuberculosis is much rarer than in England, and there is only a minor peak at the beginning of the curve. The female curve has the same character with a single peak at about twenty-five years; but the male curve shows a steady rise from puberty to the age of fifty to sixty years without a definite peak during young adult life.

Race and Genetic Constitution.

There is sufficient evidence to make it certain that there are significant racial differences in response to infection with tubercle bacilli. It is of particular interest, however, that non-European races which have been exposed to tuberculosis for several generations—for example, Red Indians and the Negroes of Mauritius—have lost their former hypersusceptibility to the disease and have now attained much the same standard of resistance as Europeans living under comparable conditions. It is reasonable to believe that in a race free for many centuries from tuberculosis, genetic combinations associated with very low resistance to tuberculosis may appear and be transmitted widely. When tuberculosis is encountered and the conditions are apt for its free dissemination, bearers of such genetic combinations are selectively eliminated and there is a premium for survival of other combinations making for resistance. It has been calculated on the basis of experience in Mauritius that it takes about one hundred years of life in a tuberculous environment to weed out susceptible strains to the level which allows a tolerable equilibrium between man and the tubercle bacillus.

With regard to the effect of heredity within a race in determining the outcome of tuberculous infection, recent work, both experimental and epidemiological, tends to support the popular belief in the importance of this factor. As in so many other problems of human genetics, the most fruitful line of approach is the study of homozygous twins as contrasted with dizygotic twins or normal siblings.

It must be stressed that children of the same parents do not in general possess the same genetic inheritance. During the process of maturation of the germ cells almost unlimited numbers of different "half-sets" of paternal or maternal genes are distributed to the individual ova or spermatozoa, and every combination in a fertilized ovum will be unique. The only way in which two human beings can arise with essentially identical genetic constitution is for the fertilized ovum to divide and so give rise to homozygous twins.

Genetic differences in resistance to a given type of experimental infection can generally be demonstrated in any of the common laboratory animals if a wide enough range of genetic material is available. This holds irrespective of whether the pathogen concerned has or has not played any possible part in determining the past evolution of the host species. There is no suggestion that wild rabbits or any form ancestral to them were sufficiently exposed to infection by acid-fast bacilli to make resistance to them a significant factor in determining survival of the species. Lurie, however, had no difficulty in obtaining strains of domestic rabbit which showed striking inheritable differences in their response to a standard inoculation with tubercle bacilli. These genetic differences did not arise as a result of tuberculous infection, nor could they in any teleological sense be regarded as adaptations to deal with the circumstances used to demonstrate their existence. We can say with some certainty that the difference depended on the accumulation of a number of random gene-mutations perhaps involving primarily several different bodily functions. It is most unlikely that well-defined single genes such as those which determine the human blood groups are involved in any of the examples of inherited resistance to infection. Most of the examples will show a "polygene" type of inheritance, of the variety familiar in studies of size, milk yield and so on in domestic animals.

With such a type of inheritance, individual children of the same family will not show a clear-cut division into susceptible and insusceptible, but will show variable degrees of susceptibility. However, the average level of susceptibility of the family will be characteristically different from that of another family. If genetic factors are important in human tuberculosis, a measure of their importance will be given by the uniformity or otherwise of the experience in regard to tuberculosis infection of homozygous twins as contrasted with other types of siblings. If from a sufficiently large material it was shown that 100% correlation was evident amongst homozygous twins, both members of each pair either being free from clinical tuberculosis or showing fairly comparable stages of clinical infection, then the only conclusion possible would be that genetic factors alone were responsible for determining the outcome of infection by the bacillus. At the other extreme, if the same degree of correlation was evident between the tuberculous experience of homozygous twins as between other pairs of siblings or between marriage partners, the conclusion would be that genetic influences were of only trivial importance.

Kallman and Reisner (1943) have made a study from this point of view of 334 tuberculous individuals, each of whom had a twin. In all, 616 twins were studied. There were 39 pairs of homozygous twins. Of these both were tuberculous in 34 instances (87·3%), while

the other five "index" individuals each had a twin free from clinical disease. Amongst the dizygotic twins only 25·6% of the co-twins of individuals with tuberculosis showed clinical disease. A practically identical figure (25·5%) was obtained when full siblings (other than twins) were investigated. The incidence in marriage partners (that is, in persons genetically dissimilar, but living in close contact) was much lower (7·1%).

In addition to the bare fact of clinical infection, homozygous twins showed close resemblance in the course of the disease. The ratio of pairs showing a similar to those showing a dissimilar course was 8:1 amongst the homozygous, but 1:2 in the dizygotic twins. A further point of great significance is that the morbidity rate in the monozygotic twins was almost independent of the presence or absence of tuberculosis in the parents.

If these findings can be accepted at their face value, they indicate that next to the fact of primary infection by the tubercle bacillus, the genetic constitution of the individual plays by far the greatest part in determining whether he develops clinical tuberculosis or not—always provided that the general environmental conditions remain approximately constant.

Within a country of homogenous race one can feel justified in assuming that individual genetic differences will be distributed uniformly if large genetically random groups are studied. Only on such an assumption is it possible to deduce something of the influence of environmental factors on the incidence of clinical tuberculosis.

The Influence of Environmental Factors in Determining the Occurrence and Severity of Pulmonary Tuberculosis.

The outstanding environmental factor is probably occupation, especially an occupation associated with lung damage by the inhalation of siliceous dust. The high incidence of tuberculosis in tin miners in Cornwall, and in workers in cutlery and in similar trades, is proverbial. Another group with exceptionally high incidence in the English statistics comprises those whose occupation is associated with undue use of alcohol—barmen, brewers and wharf-labourers. I have mentioned briefly the observation that the mortality rate from tuberculosis amongst African Negro labourers in the Witwatersrand gold mines was much higher than amongst the same race living under native conditions. The difference seems to be related more to the physical effects of their occupation than to an increased proportion of primary infections. A somewhat similar condition was observed in France in 1917-1918 amongst Negro troops and labour battalions, amongst whom tuberculosis was prevalent and severe. For Negroes at least, and probably for all races, abrupt change to a new uncongenial environment has a deleterious effect and may allow activation of tuberculosis in a person who would otherwise have remained healthy. Since in practice all these unaccustomed environments also provide increased facilities for infection and reinfection, it is difficult to be quite certain that the direct environmental effect on the body's resistance is really the essential factor.

It is orthodox to believe that under-nutrition plays a significant part in producing pulmonary tuberculosis; but as Aycock and Lutman have pointed out, there is extremely little worthwhile evidence in support of this hypothesis. The rise in tuberculosis figures in France during the occupation by the Germans was definite but not alarming. Much of this rise may have been due to under-nutrition, but increased exposure to infection, cold and psychological factors may all have been concerned. The experience of Denmark in the 1914-1918 war period offers the best evidence for the importance of nutrition in influencing the death rate from tuberculosis. Here the death rate did follow closely the degree to which the standard of nutrition was depressed. It is reasonable to believe that inadequate nutrition will hinder the processes of recovery, but it has yet to be proved that minor nutritional deficiencies in normal populations have an influence at all comparable to that of genetic constitution.

The Significance of Allergy in Tuberculosis.

In the first draft of this lecture, I attempted a discussion of the significance of allergy in tuberculosis. It is a highly controversial subject and one of the greatest interest to a theoretical immunologist. But I think its significance from my present approach is limited to the use of the tuberculin test as an indication (*a*) that a positive reactor has been infected in the past, and (*b*) that he possesses, in virtue either of his reactivity to tuberculin or of some associated change, an increased resistance to tuberculosis.

The future may provide a much more significant analysis of allergy in tuberculosis. Unless the indications are wholly misleading, the age and sex incidence of phthisis is associated with the changing allergic reactivity of the body at different periods, and it is more than probable that genetic factors of susceptibility or resistance operate through this same channel of the cellular reactivity. Beyond the bald statement that there is clear evidence quite apart from tuberculosis that allergic potentialities are associated with genetic factors, little can be said as to how genetic factors can exert such an influence. Nor does there seem to be any real explanation of the phenomena in statements that after puberty hormonal adjustments result in lowered resistance to endogenous reinfection or that pregnancy and lactation put a strain on the body that has a like result. Somewhere in this hidden mechanism there may be key reactions to be discovered which will some day allow effective intervention to prevent what is at present predestined by inheritance. For the present, the increased danger of activation of pulmonary tuberculosis in adolescence and young adult life, and in men during late middle age must be recognized.

The Apparent Failure of Current Therapeutic Measures to Influence Mortality from Pulmonary Tuberculosis.

There is an enormous literature in regard to the treatment of pulmonary tuberculosis, and in the last twenty or thirty years there have been far-reaching changes in the character of the standard treatment. The use of artificial pneumothorax, for instance, has become more and more extensive, and more severe surgical procedures are being increasingly used. If these methods are effective, they should be reflected in a diminishing case mortality rate of tuberculosis which could be recognized from the available statistics.

It is therefore, I think, salutary to realize that so far it is almost impossible to find real evidence that therapeutic measures have been responsible for any significant part of the diminishing general mortality rate from tuberculosis. Studies that have been made of the ratio between cases notified and deaths reported in different communities have shown very little change in the last twenty to thirty years. One may mention those of Drolet for several American cities and States from 1915 to 1935, and those of Stocks for English experience up to 1943. Our own Australian figures, as far as I have been able to obtain them, equally show no consistent trend to suggest that the persons notified as suffering from pulmonary tuberculosis have now a lower fatality rate than they had twenty years ago.

On the other side of the picture there are many of the more progressive sanatoria which have published figures to confirm the current clinical impression that collapse therapy is of undoubted value to the patient, and that in fact only a very small proportion of demonstrable cavities will heal at all without such therapy. The admitted failure to influence the over-all figures is generally ascribed (i) to the fact that now, as in previous years, most patients come under observation with far advanced disease, and (ii) that collapse therapy is only now emerging from the experimental stage, and that in the past many patients were treated by unsuitable methods which were often positively harmful. As an outsider I must accept the orthodox modern teaching that artificial collapse of the affected lung by some appropriate method is indicated whenever cavitation has

occurred. The reduction in the amount of sputum that results is at least an objectively verifiable fact, and one which must be of benefit both to the patient and to those in contact with him. It is possible, perhaps even probable, that if every person with early reinfection tuberculosis was competently treated according to modern standards, the fatality rate might fall precipitately. It is an ideal worth aiming at; but I do not feel that we should be too confident that it can be attained.

The history of treatment of subacute and chronic human maladies in the past is not such as to make one accept clinical judgements unreservedly. In acute infections it is relatively easy to set up an adequate clinical test of any new therapeutic procedure; but the problem is far more difficult in a disease like tuberculosis, in which there is no uniformity from case to case, in which unpredictable tendencies to spontaneous cure exist, and in which uncontrollable genetic factors obviously play a large part. I do not believe that the value of any of the current therapeutic methods against tuberculosis has ever been quantitatively assessed, and unless the basic relation between patient and doctor changes fundamentally I do not think it will ever be possible to make such an assessment. In other words, treatment can never become scientific in the strict sense, but must continue to be based on tradition and experience with what help can be gained from analogy with animal experiments. What one can ask for, however, is that records should be maintained which allow us to estimate with some accuracy the current effectiveness of standard treatment of patients with the common types of the disease. If we find from such records that the results of treatment are actually improving from decade to decade, we can feel certain that current therapy is along the right lines. If, as seems to be the present position, we can find no such assurance from the available figures, something somewhere is wrong, and it is incumbent on those concerned with the treatment of tuberculosis to remedy it.

The Prevention of Tuberculosis.

Before I discuss the means of preventing tuberculosis and the likelihood that their application will be successful, it will be advisable to recapitulate the main relevant points.

1. In the absence of infection with the tubercle bacillus there is no tuberculosis.

2. When infection occurs, the outcome for the individual is determined by three main factors: (*a*) the genetic constitution; (*b*) the age at which primary infection occurred; (*c*) environmental factors, of which occupation is the most important.

3. Current therapeutic measures have on the whole had disappointingly little influence on the course of the disease in the average patient.

4. The balance of evidence favours the view that benign infection during childhood (as evidenced by a positive reaction to tuberculin tests) confers significant resistance against reinfection in young women during the dangerous period from fifteen to twenty-five years of age.

There are two rather clearly defined methods of approach to the prevention of an infectious disease. The first and most radical is to attempt to prevent infection from ever occurring. If one exterminates all mosquitoes malaria is automatically extinguished; typhoid fever disappears in any educated community with adequate sanitary plumbing; and smallpox need never slip past an effective quarantine service. The essence of such an approach is that it is practicable to apply the public health measures needed to prevent infection and to maintain them indefinitely or at least as long as the infectious disease in question remains in existence anywhere in the world. The second approach is to accept the continuance of infection as inevitable and to take measures to render infection harmless to the individual either by immunization or by some type of chemoprophylaxis or abortive treatment.

The first problem in regard to the prevention of tuberculosis is to decide whether the first approach is practicable either immediately or within some measurable future time. If not, the second approach will need consideration, and in any case it may be needed in the preliminary stages of an attempt at eradication of the disease.

Tuberculosis is transferred in general by the inhalation of infected air-borne particles derived ultimately from the lesions of a tuberculous person. Such transfer could be effectively prevented if all persons liberating tubercle bacilli into the environment could be removed from the general community, or alternatively so trained in regard to the hygiene of disposing of sputum, excreta *et cetera* as to prevent any liberation of the bacillus. If it is correct that only persons with "open" lesions of tuberculosis can infect others, it is at least theoretically possible to devise administrative measures that should eventually eliminate the disease. The crux of the matter is the ability to recognize the sources of infection within the community. In diseases like cerebro-spinal meningitis or poliomyelitis the infector is nearly always a symptomless carrier, and control of the sources of infection is therefore impossible. But if, say, 95% of the sources of tuberculous infection can be recognized—for example, by mass radiography followed by closer examination of those with suspicious shadows—then much can be hoped for. The second stage (I again speak from the ideal rather than from the practical standpoint) is to ensure that the recognized excretors of bacilli are segregated from contact with susceptible persons until they cease to be infectious.

It is the contention of the great majority of public health workers on tuberculosis in North America that current knowledge is such as to justify progressive action along these lines, and that elimination of tuberculosis from countries of high living standard is possible within something less than fifty years.

To turn from the ideal to the practical, the main requirement is to find the excretors of bacilli who are not seriously ill enough to come automatically under medical supervision. Probably the most important type is the middle-aged or elderly person, usually a male, with "bronchitis"; but in all adult age groups there may be potentially dangerous persons. The most practical and effective approach is probably via chest radiography. Universal annual examinations covering all persons aged over fifteen years and with no exceptions are the counsel of perfection. This procedure would be almost useless without an element of legal or moral compulsion *plus* an assurance that persons found to be tuberculous would not thereby suffer serious social disabilities. It seems to me doubtful whether any Australian government or its advisers have faced the cost and administrative difficulties of carrying out an honestly conceived campaign along these lines for the eradication of tuberculosis. A voluntary campaign will undoubtedly bring along large numbers of healthy and intelligent and socially cooperative people to be examined, and in large industrial groups mass opinion may even compel the attendance of the non-cooperative. But I suspect that the majority of dangerous excretors would not attend voluntarily.

My own sense of what is practical is something much more modest than universal regular and compulsory mass radiography. It would develop in two directions. The first is to provide facilities so that all persons with illness which takes them to hospital or a private doctor can be radiographically examined as a routine part of any medical examination, irrespective of whether any immediate suspicion of pulmonary tuberculosis arises or not. The adoption of this policy is immediately called for in all public hospitals and should be the first call on mass radiography equipment as it becomes available.

The second line of approach is through tuberculin testing in the schools. If all children entering school at the age of five or six years were tested for reactivity, a valuable clue to the existence of excretors of bacilli in the homes of reacting children would be obtained. A child of six with a positive Mantoux reaction is not likely to have been infected elsewhere than in the home,

and the detection of the infector by appropriate inquiry might diminish one of the most important dangers.

Both these approaches seem to me to be more hopeful from the point of view of obtaining cooperation from the non-cooperative. In the first, the person concerned has admitted his ill-health to himself by his seeking medical aid, and is thus automatically likely to accept treatment and what it implies without resentment. In the second approach the demonstration to an adult that he has already infected and imperilled a child and may do the same to others, places a responsibility on him which he will find it very difficult to shirk.

If developments along these lines resulted in the recognition of, say, 80% or 90% of the persons in the community who were active liberators of tubercle bacilli, we should certainly find it impossible at the present time to place all of them in sanatoria. The question therefore arises how infective individuals, who are not seriously ill and who cannot therefore be given sanatorium or similar accommodation, can best be rendered harmless to the community. The same problem applies to those patients who are discharged nominally cured from sanatoria, but who are liable to a reactivation of their lesions at any time. The current policy is one of supervision and education in the technique of avoiding infection of others—and this must remain the basis of control. It is sure to be much less than 100% effective, and it any additional measure can help it needs careful consideration.

This brings us to the question of preventive vaccination. As long as active tuberculosis is present in any members of the community, some persons will be exposed to serious risks of infection. A parent with several young children, only one of whom reacts to tuberculin, is found to have minor but infective lung lesions. The still uninfected children obviously need some sort of protection. Nurses and wardsmaids are required for hospitals and sanatoria, and have a right to demand the maximal protection that can be provided.

Current opinion is that by immunization of non-reactors to tuberculin by one or other of two strains of living avirulent tubercle bacilli a reactive state can be produced and a highly significant degree of increased resistance conferred. Many millions of immunizations with *Bacille Calmette Guérin* have been carried out, and there is unanimity as to its harmlessness and near unanimity in regard to its effectiveness in reducing subsequent tuberculosis morbidity. However, there are still some who doubt whether absolutely rigidly controlled comparisons have shown any significant effect. It is difficult in practice to avoid the situation in which the children or nurses immunized with "B.C.G." are better cared for in various other aspects than those who must perforce be designated as controls. The other immunizing culture is the vole bacillus of Wells, which appears from animal and human experiment to be very similar to "B.C.G.". Its main potential advantage is that it produces a fairly standardized lesion in its natural host the English vole (*Microtus agrestis*), and could probably be maintained at a standard level of human virulence by passage through this animal. I need not go into any detail about the methods of preparing cultures for use or of the precautions necessary to avoid the slightest possibility of the cultures' becoming contaminated with virulent bacilli. The inoculations nowadays are most frequently given by multiple dermal puncture. Superficial papules corresponding to each point appear in a week or two and develop into tiny superficial abscesses or pocks which heal readily. The Mantoux reaction has appeared in more than 90% of cases six weeks after inoculation, and remains for a varying number of years.

The weight of evidence seems strongly in favour of the use of "B.C.G." for protection of persons exposed to special dangers of infection. Recent work of Aronson and Palmer (1946) on the use of "B.C.G." in Red Indian reservations in the United States and Alaska has shown particularly clear results in favour of the vaccinated. The most important objection to its use may seem trivial—this is, that its administration necessarily makes the subject a reactor to tuberculin, and any widespread use of the method in the community would render it difficult to obtain a valid picture of the epidemiological situation in regard to tuberculosis.

Finally, I should like to make a plea for the association of what may be called either fact-finding or research with whatever may be undertaken in the way of a campaign to eradicate or diminish tuberculosis. It is only too easy to present a programme on how to eliminate tuberculosis in a generation, and it is only too likely that legislative attempts to put such a programme into action will be inept. We have only an indefinite notion of the factors which have resulted in the steady fall of tuberculosis mortality in Australia and elsewhere from 1880 onwards. There is no evidence that the fall was significantly influenced by direct anti-tuberculosis action, either toward prevention or in the treatment of patients. It may be that more important processes are at work than any of those I have discussed, and it is certainly desirable that if a planned attack on tuberculosis is to be made some measure of its effectiveness should be sought. The indices which might be used to determine the influence of measures for prevention are as follows: (i) the mortality from tuberculosis; (ii) the proportion of positive radiographic findings in successive surveys of similar classes of the community; (ii) the proportion of persons reacting to tuberculin in certain chosen groups, the most useful being (*a*) children entering school at five or six years and (*b*) young adults entering the services, university, nursing training and so forth. If such information was obtained as a routine measure and collated at intervals of, say, five years, it should become possible to plan for a continued reduction in tuberculosis in a much sounder fashion than is possible at present, when the only index available of any real value is on mortality statistics.

Conclusion.

Perhaps I should apologize for a certain tone of scepticism that has run through this discussion. It derives essentially from my conviction that the problems of human disease are always more complex than they seem, that most generalizations are dangerous, and that any practical application of even the most promising idea in therapeutics or prevention requires rigid statistical study of its results. There are far too many examples in the history of medicine in which useless or positively harmful procedures have flourished unconscionably long through lack of such study. But despite all this scepticism we can, I think, be basically optimistic; pulmonary tuberculosis is a waning disease, and intelligent action should be capable of accelerating its decline perhaps even to the point of its extermination.

DENGUE FEVER AT FANNING ISLAND (CENTRAL PACIFIC).

By S. G. Ross, M.D.,

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AMONG problems connected with the epidemiology of dengue fever, the "afebrile" or "nearly afebrile" type is one of particular interest. This type has been observed from time to time by medical practitioners working in areas where dengue fever is endemic.

Siler *et alii*,[1] working in Manila, observed among their experimental infections "a small number of cases with practically no fever".

G. F. Lumley in his excellent monograph on dengue[2] makes the following statement:

> It does seem not unlikely that afebrile dengue may occur, particularly among those who have lived for

some time in an endemic area and who might therefore be expected to possess some degree of immunity.

When I arrived at Fanning Island in February, 1946, I noticed some peculiar cases of malaise among natives and Chinese, which were characterized by the presence of the following symptoms: (i) pain and heaviness in the muscles and about the joints of the legs and arms and in the back; (ii) frontal headache; (iii) ocular pain, mostly orbital; (iv) frequent and sometimes painful micturition; and (v) distaste for food. The temperature in such cases was as a rule normal. This malaise usually lasted for three to five days, leaving the patient weak and exhausted. I encountered in 1946 thirteen similar cases (six in natives and seven in Chinese), and in 1947 (January to September) nineteen more cases (two in Europeans, ten in natives and seven in Chinese).

In view of the presence of *Aëdes scutellaris* at Fanning Island (see "Fanning Island (Central Pacific): Its Past and Present"[1]), identified by the School of Public Health and Tropical Medicine, the University of Sydney, the question arose whether these cases of peculiar malaise could not be cases of the "afebrile" or "nearly afebrile" type of dengue fever.

Typical Dengue Fever.

Before giving the details about 32 cases of the "afebrile" or "nearly afebrile" type of dengue fever observed at Fanning Island, I should like to point out that during the same period I encountered at Fanning Island fourteen cases of typical dengue fever, three being of "continued-fever" type and eleven of "saddle-back" type. In Figures I and II the characteristic features of two cases are presented.

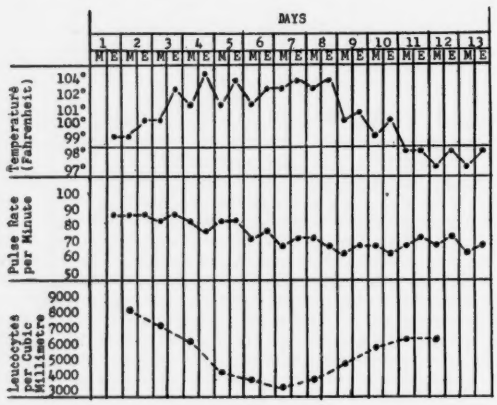

DAYS
1 2 3 4 5 6 7 8 9 10 11 12 13
M E M E M E M E M E M E M E M E M E M E M E M E M
Temperature (Fahrenheit)
104° 102° 101° 100° 99° 98° 97°
Pulse Rate per Minute
100 90 80 70 60 50
Leucocytes per Cubic Millimetre
9000 8000 7000 6000 5000 4000 3000

FIGURE I.

CASE III.—The patient was a male European, aged forty-six years (Figure I). He had been at Fanning Island for six months when this attack began. He had had the first attack of dengue six and a half years earlier in India. The leucocyte count was made every morning at 8 a.m., just before breakfast. The differential count revealed typical destruction of the mature granulocytes and their replacement by "staff" and "young" forms, which reached its peak on the sixth day of the disease. Orbital pain, a slight degree of photophobia, insomnia, dysuria (without albuminuria), anorexia and constipation were all present. No primary rash was observed, but a secondary rash appeared on the fifth day; it was of a measly type and confined to the face, neck, wrists and ankles. It lasted for twelve hours, without causing much distress.

CASE VII.—The patient was a male Chinese, aged thirty-two years (Figure II). He had been resident at Fanning Island for seven years, and this was his third attack of dengue at Fanning Island. Severe orbital pain, photophobia, insomnia, dysuria (with a trace of albumin during the first three days), severe muscular pains, backache and headache were present. No rash was observed. During a second, short attack, both mental and physical depression and intense headache were more prominent than during the first attack.

All fourteen cases of typical dengue fever observed by me at Fanning Island can be classified as shown in Table I.

As can be seen from Table I, ten out of eleven "mild" cases of dengue fever at Fanning Island belong to the group of recurrent cases. Three "severe" cases occurred among persons who had had no previous attacks of dengue fever at Fanning Island and who had recently arrived on the island.

The "Afebrile" or "Nearly Afebrile" Type of Dengue Fever.

In the group of "afebrile" or "nearly afebrile" type, the clinical and pathological findings in 32 known cases are presented in Table II.

Analysis of the figures in Table II shows that the following features in the "afebrile" or "nearly afebrile" type of dengue fever are prominent: (i) usually a sudden onset, without prodromata; (ii) a duration of the attack between three and four days (five days is an exception); (iii) usually normal temperature; (iv) slow or normal pulse; (v) muscular pain and heaviness in the limbs;

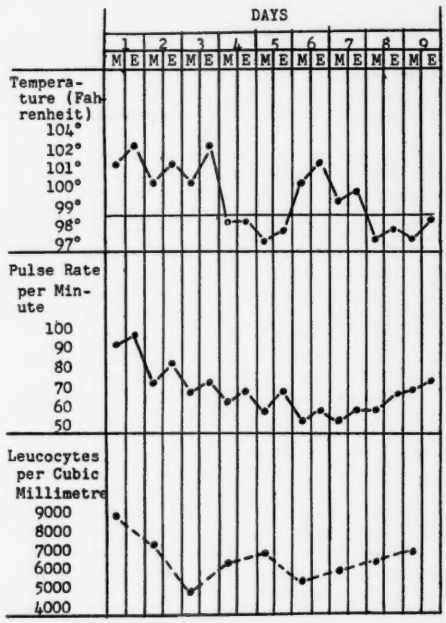

DAYS
1 2 3 4 5 6 7 8 9
M E M E M E M E M E M E M E M E M E M E M E M E M
Temperature (Fahrenheit)
104° 102° 101° 100° 99° 98° 97°
Pulse Rate per Minute
100 90 80 70 60 50
Leucocytes per Cubic Millimetre
9000 8000 7000 6000 5000 4000

FIGURE II.

(vi) headache; (vii) ocular pain; (viii) insomnia; (ix) anorexia; (x) constipation; (xi) polyuria and dysuria; (xii) leucopenia and typical destruction of the mature granulocytes.

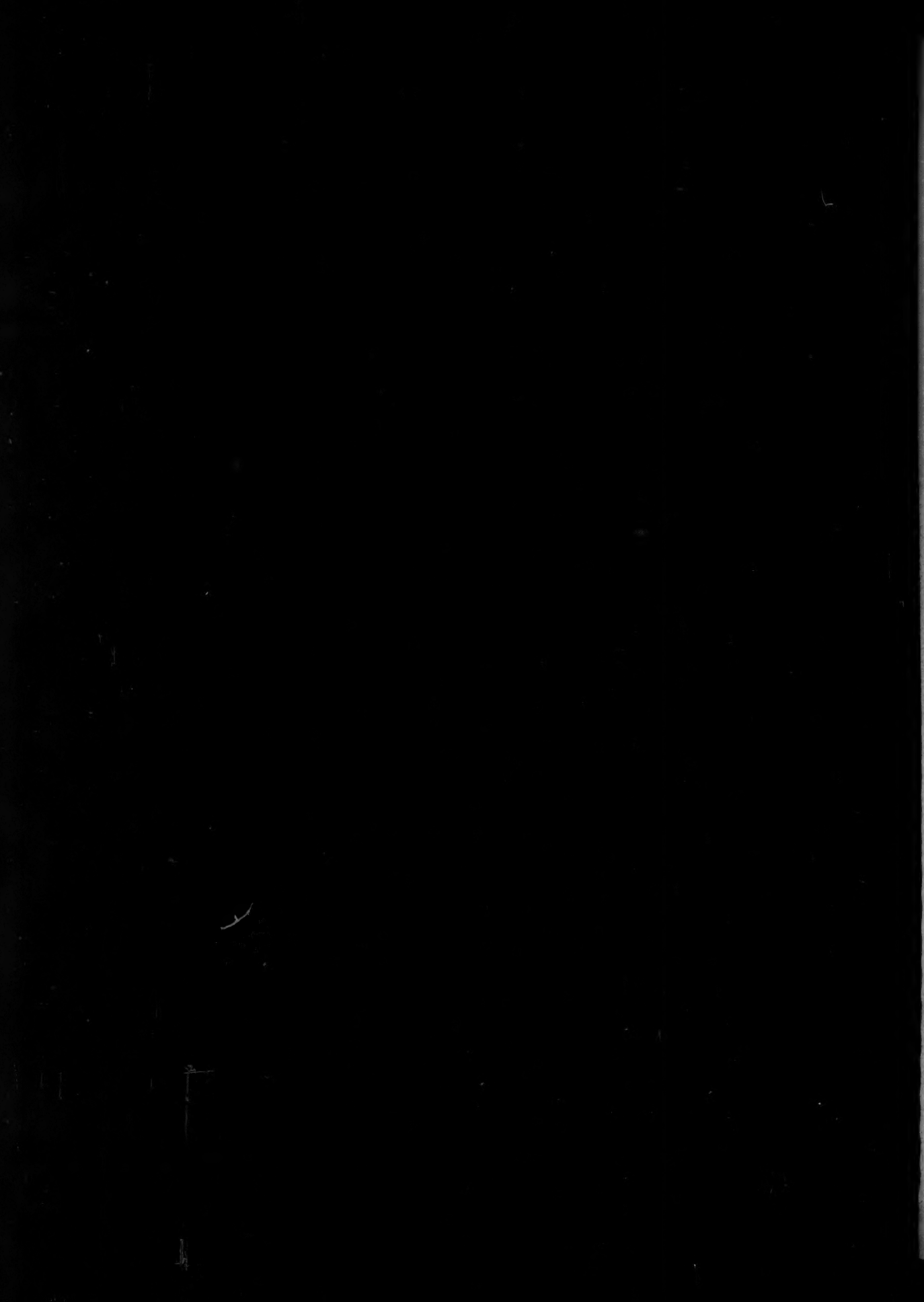
All 32 cases of "afebrile" or "nearly afebrile" type of dengue fever at Fanning can be classified as shown in Table III.

Experimental Investigation.

Experiments were undertaken to determine the answers to three problems: (i) To what extent is it justified to record these cases as "afebrile" or "nearly afebrile" type of dengue fever? (ii) Is the "afebrile" type of dengue transmissible from one person to another, and is *Aëdes ægypti* its vector at Fanning Island? (iii) What is the reason for the existence of both "febrile" and "afebrile" types of dengue fever on such a limited area as Fanning Island?

At Fanning Island facilities for carrying out a piece of research are limited, and I have had no alternative but to begin an experiment with self-infection.

Fifteen *Aëdes ægypti* mosquitoes, laboratory reared, were fed on a patient suffering from "afebrile" dengue fever



during the first day of illness. The patient, a resident at Fanning Island for eight years, had had a typical attack of dengue fever about five years earlier. This attack was of "continued-fever" type, lasted for about six days, and as far as I could ascertain, was accompanied by a rash on the wrists and ankles. On examination, this patient had severe muscular pain in the legs and arms, backache, headache, orbital pain and slight photophobia. The leucocytes numbered 6000 per cubic millimetre. No parasites were present in thick and thin films. The temperature was 100° F. and the pulse rate was 80 per minute. The attack, as was found later, lasted for four days and was in all other respects similar to those observed at Fanning Island.

TABLE I.

Race.	Residence at Fanning Island.						Total.
	Six Months.		Six to Eighteen Months.		Two Years and Over.		
	m.[1]	s.[1]	m.	s.	m.	s.	
European	0	1	1[2]	0	0	0	2
Chinese	0	0	0	0	3[3]	0	3
Native	0	0	5[4]	2[5]	2[4]	0	9
Total	0	1	6	2	5	0	14

[1] "m" means a mild attack of dengue fever, "s" means a severe attack.
[2] Severe attack twelve months earlier.
[3] All had had severe dengue two to four years earlier.
[4] Previous attacks in six cases.
[5] No previous attack.

Four of the infected *Aëdes ægypti* mosquitoes died before the beginning of the experiment with self-infection.

TABLE II.

Clinical and Pathological Findings.	Number of Cases.
Sudden onset without prodromata	25
Gradual onset	7
Duration of the attack, three days	19
Duration of the attack four days	12
Duration of the attack five days	1
Parasites in the blood	0
Leucopenia (in only 15 cases were total leucocyte counts made regularly)	15
Typical destruction of mature granulocytes	15
Normal temperature (97·0° to 98·5° F.)	28
Maximum temperature 99·0° to 100·2° F.	4
Pulse rate 45 to 70 per minute	26
Pulse rate 75 to 85 per minute	6
Headache	32
Muscular pains and heaviness in the limbs	32
Backache	25
Ocular pain	27
Rash on the face	1
Rash on the face, wrists and ankles	1
Rash on the wrists and ankles only	2
Involvement of the lymphatic glands	2
Anorexia	30
Nausea	3
Vomiting	2
Constipation	29
Diarrhœa	3
Insomnia	28
Mental depression	9
Polyuria	31
Dysuria	24
Albuminuria	5

The infected *Aëdes ægypti* were kept for ten days in a box, the sides of which were replaced by absorbent gauze. A few pieces of wet cotton wool were kept in the box, though the relative humidity in the room was 74% to 75%, and the minimum temperature during observation was 73° F. (dry bulb).

After ten days I allowed eleven mosquitoes to bite my left forearm. Four mosquitoes failed to bite, but seven took the active part. After this precautions were taken to avoid further attacks by outside mosquitoes, and an insect repellent was frequently applied over the exposed parts of the body as well as on the clothes. Seven days and six hours later I developed an attack of "nearly afebrile" type of dengue with the maximum temperature of 100·4° F. The following are my own observations during the illness.

On January 11, 1947, at 5 p.m., I felt sudden severe rheumatic pain in the legs, the knee joints and the forearms. Headache, backache and slight post-orbital pain appeared about 9 p.m. The temperature at 5 p.m. was 98·4° F., but it rose to 100·4° F. at 9 p.m. and remained there until the next morning. The pulse rate was between 70 and 80 a minute. During the night I woke several times. My legs and arms felt very heavy, as if metal had been injected into their muscles.

On January 12 the pain in the legs had increased, and ocular pain appeared during the day. Micturition was frequent and painful during the day; no albuminuria was present. The urine was clear, with a slightly acid reaction. In the evening I had to keep an ice bag over the calf muscles and over the groins to relieve the pain. The temperature was normal, and the pulse rate was 55 to 70 per minute. The leucocytes numbered 4500 per cubic millimetre; 50% were neutrophile cells and 43% were lymphocytes.

TABLE III.

Race.	Residence at Fanning Island.			Total.
	0 to 12 Months.	13 to 24 Months.	Over Two Years.	
European	1[1]	1[2]	0	2
Chinese	2[2]	0	12[1]	14
Native	5[2]	0	11[1]	16
Total	8	1	23	32

[1] History of previous severe attack of dengue at Fanning Island.
[2] No history of previous attack of dengue at Fanning Island.

On January 13 the whole body was itchy for about three hours in the morning, but no rash was observed. There was no pain, but the feeling of heaviness, especially in the calf muscles, persisted during the whole day. The temperature was 98·0° to 98·6° F. and the pulse rate was 50 to 60 a minute. Slight headache was present, but no ocular pain was felt. I had no appetite. Constipation was absent.

On January 14, except for a feeling of heaviness in the legs and general weakness, the condition was back to normal. The temperature was 98·4° F. and the pulse rate 60 to 70 a minute.

On January 15 the appetite was back to normal. Slight weakness was present in the legs.

It should be pointed out that six months before the experiment I had had at Fanning Island a severe attack of dengue fever of the "continued-fever" type which lasted for nine days; the maximum temperature was 104·0° F. on the fourth day of the illness. Previously I had had dengue in 1939 in Bombay.

It is regretted that no volunteer was available at the time of this experiment on whom experiments could be carried out to determine whether the virus of experimental dengue could be transmitted to another person, and what was the course of the disease in the case of a volunteer who had no previous history of dengue fever.

Later, however, I had the opportunity to carry out another experiment, though in this case the volunteer also had the history of previous attacks of dengue at Fanning Island.

The results of this experiment can be summarized as follows:

1. Ten laboratory-reared *Aëdes ægypti* mosquitoes were fed on a patient suffering from the "nearly afebrile" type of denge during the first day of the illness, when the patient's temperature was 99·8° F. (the highest temperature observed in this case was 100·2° F.).

2. After the mosquitoes had been kept under observation for nine days, during which period three mosquitoes died,

seven were allowed to bite the volunteer's left forearm. Only five took an active part in biting.

3. Eight days and two hours after the experimental biting the volunteer developed typical symptoms of the "afebrile" or "nearly afebrile" type of dengue fever.

4. The maximum temperature observed in this case of experimental dengue fever was 99·6° F. The attack lasted for three days.

5. Pain in the legs, heaviness in the calf muscles, headache, insomnia, dysuria and leucopenia were the prominent features.

Discussion.

The question arises whether we are to consider that the absence of high temperature in both experimental and natural cases of the "afebrile" or "nearly afebrile" type of dengue fever at Fanning Island is due to a considerable degree of immunity or tolerance, which has developed amongst the residents of this island as the result of repeated attacks of dengue, or whether different immunological strains of dengue virus are responsible as well for the appearance of the different types of the disease.

There is no uniform opinion among numerous investigators on the duration of immunity in the case of dengue fever. While some, like Hirschfeld (1898), Montague (1908), Bonne (1918), George (1925) and Blanc and Caminopetros (1930) believe that dengue is able to produce either absolute or at least strong and lasting immunity, others, like Holt and Kintner (1931), are of the opinion that the previous attacks have almost no protective influence on subsequent attacks.[3]

The following statement was made in the first paper on Fanning Island:[5]

> With the exception of a few persons born at Fanning . . . there is no permanent population. The floating population consists of Gilbert Islands workmen engaged by Fanning Island Plantations, Limited, some Chinese engaged by the cable station, and a small colony of Europeans who come to Fanning mostly for a two years' term.

However, during the war there was no change in the Chinese population for over seven years, and some Chinese stayed at Fanning Island even as long as ten years. The native labourers also stayed beyond their term.

During the day, and in the evening, when *Aëdes ægypti* is very active at Fanning Island, the population is easily exposed to this mosquito's attacks. It is only natural that during their prolonged stay at Fanning Island both natives and Chinese should sooner or later fall victims to dengue fever, and that with each subsequent reinfection (the attacks probably following one another after a short interval) they should develop at least tolerance to the virus of dengue fever.

The figures in Table I seem to support the theory of tolerance to the virus of dengue fever after reinfection. Three "severe" cases of dengue fever were observed amongst newcomers to the island.

On the other hand, the occurrence of a few cases of the "afebrile" or "nearly afebrile" type of dengue fever at Fanning Island amongst those who had had no previous "febrile" attacks of dengue fever at Fanning Island or elsewhere for some years past, seems to indicate that there may be a few different immunological strains of dengue virus on this island.

The following two cases are of particular interest.

CASE LIV.—The patient was a European female, aged forty-five years. Having been a resident at Fanning Island for eighteen months, this patient suddenly became ill and developed a "nearly afebrile" attack of dengue fever. Twelve hours before the onset the patient had had a scarlatiniform type of rash on both legs, more prominent around the ankles. Pain and heaviness in the limbs, especially in the region of the calf muscles, headache, backache, frequent and painful micturition and leucopenia were the main features observed in this case. The attack lasted for three days, the maximum temperature being 100·0° F. during the night following the onset. Otherwise the temperature was between 98·0° and 99·0° F., the pulse rate being 65 to 80 per minute.

This patient had only once had dengue fever before, in November, 1939, in India.

CASE XLV.—The patient was a male Chinese, aged thirty years, who arrived at Fanning Island from Hong Kong in May, 1947. He had no previous history of dengue fever. In August, 1947, this patient had an attack of "nearly afebrile" type, the maximum temperature being 100·4° F. The attack lasted for three days. The clinical symptoms and pathological findings were similar to those observed in Case XLIV, but without the rash.

Recently I have encountered three more cases of "afebrile" or "nearly afebrile" type amongst natives who became ill three months after their arrival at Fanning Island from Tarawa (Gilbert Islands). All three were living in the same hut. But in these cases no reliable history could be obtained as to the occurrence of previous attacks of dengue fever in the Gilbert Islands, where it is a very uncommon disease, and where the last outbreak of dengue fever occurred about three years ago, according to a personal communication from the senior medical officer of the Gilbert and Ellice Islands colony.

Summary.

1. Two types of dengue fever at Fanning Island (Central Pacific) are described. Between February, 1946, and September, 1947, there were 14 "febrile" or "typical" cases and 32 cases of "afebrile" or "nearly afebrile" type.

2. The clinical symptoms in the "afebrile" or "nearly afebrile" type are almost identical with those observed in the "febrile" type at Fanning Island. The onset is usually sudden, without prodromata. Muscular pains, heaviness in the limbs, headache, constipation, insomnia, frequent and painful micturition, leucopenia and typical destruction of the mature granulocytes are the most prominent features of the "afebrile" or "nearly afebrile" type.

3. It is suspected that *Aëdes ægypti* is the vector of dengue fever at Fanning Island. In two cases of "afebrile" or "nearly afebrile" type this was proved experimentally.

4. Analysis of the cases of "afebrile" or "nearly afebrile" type seems to support the theory of tolerance to the virus of dengue after reinfections. On the other hand, it is probable that a few different immunological strains of dengue virus are present at Fanning Island, as a few cases of "afebrile" or "nearly afebrile" type were observed amongst those who had had no previous attacks of dengue fever at Fanning Island or elsewhere for many years past.

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(3) G. F. Lumley: *Loco citato*, page 118.

(4) S. G. Ross: "Fanning Island (Central Pacific): Its Past and Present", THE MEDICAL JOURNAL OF AUSTRALIA, November 1, 1947, page 541.

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THE GENERAL PRACTITIONER AND THE SPECIALIST.[1]

By LESLIE HURLEY,

Melbourne.

DURING the past few years there has been an increasing body of opinion, both here and in other parts of the world, that there have been a deterioration in clinical ability and a weakening of personal relationship between doctor and patient, both of which are fundamental to sound medical practice.

These developments have been due mainly to the rapid extension of our knowledge of the ancillary sciences and an increase in the number of the various special methods of examination and treatment.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on November 12, 1947.

During the past century there has been more progress in "scientific" medicine than in the previous thousand years. Knowledge, some of it ill-defined, and special methods of examination have increased rapidly, but standards of normality in connexion with many of the more recent tests and their relative worth in diagnosis and prognosis have not yet been clearly established.

The exact significance of the Wassermann test, although it has been in common use for about forty years, has not yet been clearly defined. It is not, as was first thought, diagnostic of syphilis, as positive reactions may be due to quite a wide variety of conditions as well as to errors in technique. It is certainly not safe to make a positive diagnosis as a result of the test alone unsupported by any other evidence.

A negative result to the Wassermann test is found in quite an appreciable percentage of cases of tertiary syphilis and in some of these sufficient clinical evidence may be found to enable a strong presumptive diagnosis to be made. All too frequently, however, the test is regarded as being the final arbiter not only in diagnosis, but in determining further treatment, without the giving of due consideration to the clinical features of the case. The Wassermann reaction may also be genuinely positive and yet the patient's symptoms be due to some other cause than syphilis.

Although there has been a great extension of knowledge in recent years, there has been no accompanying increase in man's powers of reasoning. In fact the reverse seems to have been the case. The physician's mind is so much occupied in the attempt to accumulate more and still more recent knowledge, much of it ill-defined, that his powers of logical reasoning and his sense of perspective are endangered and he is apt to place undue significance and reliance on a specialist or laboratory report, to regard them as being above criticism, and to fail to give due weight to a well-taken history and a careful bedside examination. Knowledge comes, but wisdom lingers, and in no field of human endeavour is this more true than in medicine.

It is, of course, no longer possible for any individual to make himself conversant with the whole range of medical science and the various ancillary methods of diagnosis and treatment. The field has become much too large. Even in limited fields it is difficult for one person to be conversant with all the recent researches and scientific literature.

Specialism has, therefore, become necessary. The specialist, however, sees only one organ and not the patient as a whole and, unless he has a sound and wide background of general medical training, is liable to become too immersed in the purely technical aspects of his subject, to establish false standards, and to attribute symptoms, which may be due to disease elsewhere or to some functional disorder, to some slight or supposed abnormality in his particular field.

This becomes a very real danger, particularly when, as not uncommonly happens, the patient goes to the specialist without first having a good general medical examination. Patients with functional complaints are very prone to diagnose the cause of their condition, for example, "catarrh", and go direct to a specialist of their own choosing.

It is very desirable, therefore, that the patient should have a good general examination before being referred to a specialist, and the specialist on his part should have and maintain a sound general knowledge of the fundamental principles of medicine; otherwise he may tend to lose perspective and fail to distinguish clearly between the normal range of variation and the abnormal.

The general practitioner, on the other hand, is too inclined to expect a complete diagnosis from the laboratory worker or specialist. He tends to deliver himself and his patient into the hands of the non-clinical scientist and to look for the answer to his problem to an X-ray examination, a cardiogram or some other special examination.

A physical sign, no matter how accurate it may be, or however obtained, diagnoses a physical state and not the disease from which the patient is suffering. An opacity at the lung apex is most often due to tuberculosis, but it may be due to other causes. Inversion of *T* waves in a cardiogram may be due to myocardial damage, but it may also result from large doses of digitalis or from errors in technique or from other causes.

The final assessment should be made, not on any single finding, but on a careful consideration of all the evidence, both clinical and laboratory.

If a careful history is taken and a good general examination made, a very large proportion of patients, particularly those with minor complaints and functional disorders, can be satisfactorily and scientifically managed without reference to the specialist or laboratory worker.

A minor physical or functional disorder may be converted into a major functional one if too much unnecessary investigation is undertaken, particularly if the various special examinations are not skilfully done and properly interpreted. Some imaginary disease or irrelevant abnormality may be disclosed and cause much unnecessary anxiety and disturbance to the patient's peace of mind.

In the case of those patients for whom outside help is required to establish a diagnosis the general practitioner should be able to assess correctly and to evaluate properly the information obtained, in the light of his own history and physical examination, without necessarily having any detailed knowledge of the technical procedures used. All the evidence, both clinical and laboratory, should be carefully considered and placed in proper perspective.

Because of too great a dependence on the laboratory scientist and specialist, there has been a deterioration in that highly skilled science of history taking.

The collection of information relative to a patient's complaint is an art which can be acquired only by constant and serious practice. Much patience and tact, an understanding and sympathetic attitude, and a good deal of time may be necessary in order to get the true facts and place them in proper perspective. Ability of this kind and a practical knowledge of the theory of evidence are absolutely essential for a successful barrister, and hardly less so for the sound practice of medicine.

Much important information can be obtained from an accurately taken history which can be gained in no other way. The early and even the more advanced phases of some diseases may express themselves only in symptoms, and the main or even the only diagnostic evidence reside in the history, for example, in some cases of angina of effort.

Physical examination, even when most thorough and complete and scientifically accurate, gives information only as to the present status of the patient. A well-taken and correctly interpreted history, with the facts placed in proper time sequence, may give valuable knowledge concerning the development of the patient's condition during the preceding months and years, particularly in those diseases which may run a long and intermittent course. A patient with a toxic goitre may give a clear history of past periods of toxicity even although the basal metabolic rate is normal at the time the patient is first examined.

Some knowledge of the natural course of various chronic diseases and their variations when untreated may be obtained by a careful consideration of a number of well-taken histories and repeated clinical examinations. Knowledge of this character is essential when an attempt is being made to evaluate the worth and effectiveness of newer methods of treatment. We need to know much more about hypertension, and the factors which determine the marked variations in its clinical course, before we can come to any valid conclusion regarding the value of sympathectomy.

From a scientific point of view there is no fundamental difference between information gained by history taking and the unaided senses and that obtained by the use of some special instrument or machine. Science resides in the intellect and not in the machine, and a careful and correctly interpreted clinical examination is just as scientific as an observation made by some special method.

Both are liable to human error and may be scientific or unscientific according to their accuracy and to whether they are logically or illogically interpreted. This is no criticism at all against correct information obtained from

the laboratory or the specialist. Such information is often exceedingly valuable and of vital importance.

There is, however, a tendency to neglect or even distrust information gained by the ordinary bedside examination and to exempt from criticism that obtained by special methods.

It is not the function of the laboratory to make the diagnosis. This should be made by the doctor in charge of the patient, who alone is in possession of all the information and who should be in the best position to interpret the facts, place them in proper perspective and then attempt to make an accurate diagnosis.

It should not be forgotten that a laboratory or clinical finding, even although entirely correct, may have no bearing on the patient's symptoms.

In addition to a deterioration in clinical ability, there has been a tendency to underestimate or even deny the importance of the close personal relationship between doctor and patient, which is fundamental to sound medical practice. Patients with functional disorders comprise a very big proportion, probably a majority, of those we are called upon to advise and treat, and even among those with demonstrable organic disease, the symptoms complained of may be partly or even largely of functional origin. We do not treat diseases as such, but human beings with disordered function which may or may not be due to organic disease.

In functional disorders and to a lesser extent in organic disease, if treatment is to be fully effective, it is necessary to know something about the patient's habits, environment, domestic life, economic status, and the emotional stresses and strains to which he or she is exposed.

Information bearing on these matters may be available only to a trusted medical adviser whose "discretion has been tested by a hundred secrets and whose tact has been tried in a thousand embarrassments". It will not in many cases be disclosed to the specialist, or to a member of a large group practice, or to an officer of a State-controlled medical service. It may be difficult even for a psychiatrist to obtain valuable personal information which may be readily volunteered to the family doctor.

In a nationalized medical service not only would the personal relationship between doctor and patient be largely lost, but there would be a tendency for the "case", no longer a "patient", to be sent the rounds of the medical factory, see a number of specialists, have performed on him a number of tests and never at any time have a good general appraisal in which due consideration is given to the personal and clinical history and the ordinary bedside examination.

The science of the laboratory and of the specialist should not supersede clinical science, but should be ancillary or even subordinate to it.

Perhaps one of the commonest problems concerning both the general practitioner and the specialist is the patient with numerous symptoms often referable to many parts of the body, but in whom nothing abnormal is found on ordinary physical examination.

Very often the patient has already sought advice in various quarters, both within and without the ranks of the medical profession. Tonsillectomy, appendicectomy or some gynæcological operation may have been performed, and various forms of treatment, including different tonics and sedatives, undertaken without relief. If the symptoms suggest the possibility of cardiac disorder, she may have been told that she has a "tired heart" or "low blood pressure". There is often the fear of some serious organic disease, such as cancer, heart disease or "brain trouble".

Anxiety, fear of the unknown, domestic or financial worry or the ordinary stresses and strains of living may be responsible for the symptoms complained of. Although these fears and anxieties may not be volunteered, it is not usually difficult to elicit them by careful and sympathetic inquiry without any probing into the depths of the subconscious mind.

Very often the patient has not thought it possible that fear and anxiety might be responsible for the symptoms complained of.

What is the best method of handling these patients?

It is, of course, necessary to exclude organic disease and to convince the patient that nothing of a material nature has been overlooked. How is this best achieved? If possible the diagnosis should be made not by a rigorous process of exclusion during which a large number of special investigations is undertaken, but by a careful consideration of the positive features which characterize functional disease, including, of course, a careful history and bedside examination. A few carefully selected special tests may be necessary according to the features of the individual case, and very often, as part of the ordinary routine, an X-ray examination of the chest.

What briefly are the positive features which characterize functional as opposed to organic disease? The facial expression and general attitude and bearing of the patient may betray the underlying worry and anxiety. A nervous blush is often present on the neck and upper part of the chest. Tremor of the lightly closed eyelids and bitten finger nails betoken a state of nervous tension. There may be profuse perspiration in the axillæ, even on a cold day. Not infrequently the patient brings a carefully compiled written list of symptoms or is accompanied by an anxious husband or wife to assist in giving the history.

A specimen of urine, which often contains phosphates, is often produced in order to make sure that the doctor makes, as he should do, a very full examination.

The symptoms are often dramatized and exaggerated, or described in some bizarre fashion. A headache is not just an ordinary headache, but is terrific, a feeling that something is being driven into the head, that the head is being held in a vice or that a piece of elastic is being stretched inside the head.

It is often very illuminating to take the patient's most prominent symptom, for example, a headache, and to try and get a detailed description of its exact type and position, and what factors affect it. You may have to ask several times to get any reasonably definite answer to the question "what type of pain is it?" and then may be told that it is not really a pain at all but a vague feeling of discomfort, a feeling that the head is empty, and that it has been present for months or years without cessation. If the patient's confidence has been obtained the admission will frequently be made that the headache, or whatever discomfort the patient suffers, is precipitated or exacerbated by worry, excitement, anxiety or nervous tension.

If the symptom in question is carefully analysed it will be found that it does not exhibit the features one expects to find in a similar symptom due to organic disease.

Not only is this so, but the symptoms in general do not conform to any recognized organic pattern. It is only by careful and persistent practice that it is possible to develop the science of history taking, which enables one to recognize the various combinations of symptoms and their associations which may be seen in functional as opposed to organic disease.

Many nervous patients complain of catarrh, but careful questioning will often reveal that what they have noticed is nothing more than the ordinary nasal secretions.

Disturbances of the sexual function and a feeling of tiredness and exhaustion on waking are often prominent complaints.

The symptoms complained of may have been present for many years and yet the appearance of good health is retained. Even if there has been loss of weight, the patient does not, as a general rule, look ill.

A full and very careful physical examination should always be carried out, otherwise any reassurance given to the patient will not carry much conviction.

The description given is very brief, and is not claimed to be in any way comprehensive. The general contention, however, is made that in many cases a carefully taken history, considered in conjunction with a full physical examination, will make it possible to say with a strong degree of probability that the symptoms complained of are not of organic origin. Even in organic disease the diagnosis is often made by a balancing of probabilities rather than by direct proof.

It is fully recognized that the early symptoms caused by serious organic disease, such as cirrhosis of the liver, cerebral tumour, chronic nephritis, general paralysis of the insane, and exophthalmic goitre, may closely resemble those of neurasthenia or an anxiety state. In these, however, there is often a shorter history, some abnormality is usually found on careful examination and, if there is any doubt, appropriate investigations should be undertaken.

Reassurance to be of any value must be definite and absolute. If the patient is not willing to accept a diagnosis of functional disease, the most prominent symptoms should be investigated, the patient meanwhile being told that every hope is entertained that the examination ordered will not reveal anything of a serious organic nature.

Reassurance, accompanied by a simple and sympathetic explanation as to how functional symptoms are produced, often goes a long way towards affording relief.

Most people suffering from functional disorders are only too willling to be relieved of the fear of serious organic disease, provided reassurance is given in a sympathetic and understanding manner and any suggestion of malingering as "imaginitis" is carefully avoided. The best person to carry out and supervise the treatment is the trusted family doctor, who alone is in possession of all the facts and attending circumstances. During the period of rehabilitation mild sedation with bromide and phenobarbital is often very helpful.

It is also advisable for the patient to be seen at intervals of two or three months, because repeated reassurance is often necessary before a cure is obtained. At these follow-up visits a careful examination should be made to ensure that no organic disease has been overlooked.

The aid of the psychiatrist should be necessary only for the more difficult patients who fail to respond and for those who suffer from a psychosis rather than a neurosis.

With the advent of the various forms of mechanical therapy there has been a tendency to forsake the gentler arts of suggestion and persuasion and reassurance and to rely more on "shock tactics". Patients suffering from neuroses are often not relieved by convulsive therapy and may even be made worse and their subsequent cure and rehabilitation rendered much more difficult.

Another difficult problem facing the general practitioner is the diagnosis of pain due to organic heart disease from that due to some other cause frequently functional in origin. There is a tendency to look to the cardiogram for the complete answer to this difficulty.

The cardiogram may be quite normal, even in the presence of organic angina, and minor variations, which may be interpreted as being due to organic disease, may occur in perfectly normal subjects or may result from faulty technique. The range of variation of the cardiogram in normal people has not yet been clearly and accurately defined.

Inversion of the *T* wave in Lead III is now generally recognized as a normal finding. In the case of vertical hearts there may be slight elevation of the *ST* segments in Leads II and III with right axis deviation. A transverse position of the heart may give a tracing showing left axis deviation with inversion of the *T* wave in Lead III. A cardiogram taken in full inspiration may show a tendency to right axis deviation with inversion of the *T* wave in Leads II and III. High *T* waves, with slight elevation of *ST* segments in all leads, is a normal variation. Digitalis taken in moderate to full dosage may cause depression of *ST* segments in Leads I, II and IV, inversion of *T* waves, and prolongation of *PR* intervals. Both tobacco and atropine tend to accelerate the heart rate and to lessen the amplitude of the *T* waves. There is no characteristic cardiogram in old age, but a good many elderly people show some cardiographic abnormality.

If the technique is faulty or the interpretation is made without due regard for variations which are normal or due to unimportant causes, the cardiogram may be most misleading or even dangerous, just as the stethoscope was twenty or thirty years ago.

In the assessment as to whether a pain may or may not be due to organic heart disease, a well-taken history is of first importance; and if it is sufficiently typical, the diagnosis should be made despite a normal cardiogram. Minor variations in the tracing should not be allowed undue weight, if not consistent with the patient's symptoms.

In so-called nervous angina, there is frequently associated evidence of an anxiety state. A sense of exhaustion and palpitation are often prominent symptoms.

The pain, which is more often precordial rather than retrosternal in position, may be described as being sharp and stabbing, it may even be terrific, or a dull heart ache lasting for days or weeks. It is related more to tiredness than to effort, and has not the clear-cut relationship to effort and rest which is so frequently seen in organic angina. Tenderness about the cardiac apex is common, and even when the pain is absent a wide variety of nervous symptoms may be complained of.

When asked what is done when the pain comes on the patient may give various replies, quite unlike the patient with organic angina, who usually states without much hesitation that he slows up or stops with relief of pain in a few minutes. The effect of trinitrin on the pain may be used as a therapeutic test.

Most difficulty arises with nervous patients who also have coronary disease, and a decision may be very difficult to make even when all the evidence has been carefully considered.

In the presence of nervous angina no significant abnormality is discovered, either in the ordinary examination or in a well-taken and correctly interpreted cardiogram, whereas in the presence of organic angina abnormalities are found in a considerable majority of patients.

In the latter condition, however, there is a significant minority in whom the physical examination reveals no abnormality, and the diagnosis has to be made on the history. Organic heart disease is rarely present in young people in the absence of any abnormal physical signs.

The diagnosis of hyperthyreoidism often presents considerable difficulties and there is a tendency to regard an estimation of the basal metabolic rate as the final arbiter in diagnosis without due regard to the clinical features.

Even if a true basal reading is obtained, and this is very difficult and sometimes impossible with a nervous patient, we are not entitled to assume that the basal metabolic rate is an absolute measure of the toxicity of a goitre.

The cardio-vascular, nervous and metabolic mechanisms are not always equally affected. A nodular goitre may, during a long period of years, ultimately cause cardiac failure with auricular fibrillation, although the basal metabolic rate at the time the patient is first seen may be normal.

A carefully taken history and a detailed physical examination may give good evidence of past toxic episodes. Surgical treatment in these cases often gives very good results, even although the basal metabolic rate is normal at the time of operation.

In many cases of hyperthyreoidism there are periods of toxicity followed by remissions during which the patient improves and the basal metabolic rate is normal. If the patient is seen during a remission, the diagnosis rests on a carefully taken history with, in addition, clinical signs resulting from past periods of toxicity.

In normal people the basal metabolic rate may vary between -10% and $+10\%$, or even between -15% and $+15\%$. In a patient whose normal reading is -10% a reading of $+10\%$ may indicate toxicity, while in an individual whose normal reading is $+10\%$ a reading of $+18\%$ may not be significant.

It has not been my experience that clinical improvement in patients being prepared for operation is always closely paralleled by a corresponding change in the basal metabolic rate, even although the tests have been carried out by a careful and reliable observer. This may be due to fluctuations in nervous tension on the part of the patient or to the fact that the toxicity of a goitre is not entirely measured by its effect on metabolism.

It is suggested, therefore, that in the diagnosis of hyperthyreoidism the clinical evidence is much more important than the basal metabolic rate. It is most unsafe, particu-

larly in the case of a nervous patient, to place much significance on a single reading.

Great difficulty is often encountered in those patients who have slight thyreoid enlargement associated with an anxiety state and marked tremor and tachycardia.

Among these, in contrast to the subjects of hyperthyreoidism, the appetite is often poor, there is no increased tolerance to cold, the skin is cool and clammy, the pulse pressure is often low, there is little or no loss of weight, there are no genuine eye signs, and the patient, instead of being bright, alert and fidgety, is more inclined to be apathetic and listless.

Due consideration should also be given to the presence or absence of rarer toxic manifestations, such as pruritus, glycosuria, intermittent diarrhœa, myasthenia, particularly in the thigh muscles, and extrasystoles in the presence of rapid heart action.

Careful watch should also be kept for those conditions with atypical onset in which, in the early stages, one or more phenomena dominate the clinical picture, for example, noticeable loss of weight, exophthalmos, pruritus, myasthenia, or gastro-intestinal symptoms.

If, after a careful consideration of all the evidence, both clinical and laboratory, the diagnosis is still in doubt, a therapeutic test with iodine or thiouracil may be most helpful in bringing about a decision.

In the numerous discussions which have appeared in the medical Press in the past few years as to whether thiouracil will replace operation in the treatment of diffuse toxic goitres, insufficient weight has been given to the knowledge gained by years of clinical experience concerning variations in the natural course of the disease and its later sequelæ. Natural remissions are not at all uncommon, and may last for a considerable period. A goitre which appears to be diffuse may at operation prove to be nodular. Cardio-vascular disease and cancer may develop at a time when there is little or no evidence of present toxicity and no elevation of the basal metabolic rate.

It is generally agreed that thiouracil, if properly administered, will alleviate thyreotoxic symptoms in a very large proportion of patients with a diffuse toxic goitre. Most observers have found that, within a period of a few months to a year or two, there is a high percentage of recurrences.

It is quite possible that the low relapse rate recorded by some workers may be due to more careful control and better technique in the medical management.

Sufficient time, however, has not yet elapsed to make it possible to say in what proportion of cases the cure is permanent, nor can any pronouncement be made as to the possibility or probability of the later development of cardio-vascular disease or cancer. The incidence of cancer is by no means negligible, and by the time the classical picture of malignancy has developed the time for surgical cure has passed. The early diagnosis of malignancy of the thyreoid is exceedingly difficult and often impossible before operation.

In addition, toxic manifestations, some of which may be fatal, occur in an appreciable percentage of cases, and very careful and long-continued medical control is necessary.

Truth has been well called the daughter of Time, and enough time has not yet elapsed to enable us to say with any degree of precision what part thiouracil will play in the treatment, other than pre-operative, of diffuse toxic goitres.

Clinical science and laboratory science each play their part in the diagnosis of disease and in the alleviation of human suffering. In any particular patient, one or the other may be the decisive factor in the making of a decision or the planning of a course of action. Both are liable to human error and should be constantly subjected to critical analysis and review.

Medicine is not a science. "Each little discovery pushes the curtain back a little further but infinity lies beyond." With so many of the fundamental problems of life still unsolved, and human nature being what it is, it is hardly likely that medicine will ever become a science in which everything is capable of quantitative expression.

But, paradoxically, we may say that scientific medicine is a compound of science, empiricism and mysticism, in which the collecting and placing of facts in their true perspective, the giving of due weight to the fruits of experience, the balancing of probabilities and a careful assessment of personal and psychological factors all play an important part. To neglect any of these is to enter the battle incompletely armed and imperfectly equipped.

ART AND SCIENCE IN MEDICINE.[1]

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THE subject of this talk is a hardy annual in most medical schools; but even if the subject is rather hackneyed the subject matter varies from time to time and with the predilections of the speaker. I can only hope that my own views will prove of interest, even if they are not particularly illuminating.

It has long been held a reproach to the biological sciences—which include medicine—that they are inexact as compared with such as physics and chemistry. This inexactness derives, of course, from the fact that biology deals for the most part with individuals, and individuals are notoriously variable. However, the application of statistical analysis to observations on groups of individuals lends much greater precision to assessing the significance of biological findings. The word "statistics" generally raises memories of the rather dull-looking tables of birth rates, death rates, mortality rates, and so on, which form such a prominent feature of any registrar-general's report. But while such statistics are of fundamental importance—they provide, for example, the basis upon which any responsible government frames its future policy—they are crude in comparison with the refined analyses devised by Galton, Pearson, Haldane, Fisher and others for the treatment of observations on relatively small groups of individuals. Such treatment is really designed to show whether or not the results obtained could have been due purely to chance; and if not to chance, what are the odds in favour of the probability that they are due to something else. This "something else" may be what you are investigating; on the other hand, it may be something quite different and you must eliminate by further analysis or controlled experiment every other possible factor.

Let me give an example. Suppose that you wish to determine the value of a specific kind of treatment for a particular disease and your results suggest that those you have treated fare better than your untreated controls. Now you must show by appropriate experiment or analysis that the observed improvement is not due to chance, age, sex, race, diet, climate, season, environment *et cetera* before you can pronounce positively in favour of the treatment you are investigating. It is obvious that neglect of these precautions renders almost completely worthless a great deal of published medical work. The value of such analysis lies in the fact that it permits valid conclusions to be drawn from relatively small collections of data. The method is becoming widespread in science, not only for assessing results, but also for planning beforehand what kind of observations, and how many, are required to secure a reliable answer.

I have touched on this matter at the outset to show that biological data are amenable to reasonably precise treatment, but I must warn you that as far as science is concerned statistics is not an end in itself; it is only one of a number of valuable weapons of attack on biological problems and can never replace accurate observation and experiment. Before I abandon this theme, however, I would like to draw your attention to two further points. In the first place the "exact" sciences suffered a rude shock when physics discovered the individual—the electron.

[1] Presidential address delivered to the Adelaide University Medical Society.

This proved as variable and unpredictable as any human being and a special kind of mathematics had to be devised to cope with its vagaries. Until then physics and chemistry had been handling enormous populations of individuals whose variability was masked by the total response; that is, both the "exact" sciences had really been making gross statistical observations. Biology, on the other hand, is concerned to know whether observations on small samples are applicable to large populations. Thus the only real difference between the two kinds of science lies in the number of individuals available for study, and it was biology that got to the core of the matter first.

As my second point perhaps I need hardly remind you that, however accurate statistical information may be, it is no guarantee of the behaviour of any given individual. Knowing the mortality rate of a particular disease to be, say, 10% does not allow you to predict precisely whether any one patient will join the 90% who survive or the 10% who do not. Since doctors are predominantly concerned with individuals, it is clear that success in treatment will depend largely upon a number of other and less tangible factors: previous experience, intelligent assessment of the total situation, skilful handling of the patient (and his relatives), and so on, together with the *je ne sais quoi* which is so frequently the mark of the eminent man. In other words, success depends in great measure upon the exercise of a collective faculty which, for want of a better name, we call "art".

It is probable that medicine will always remain something of an art, and this should not be held to its discredit. But the fact may not be held an excuse for slipshod and careless work or neglect of proper scientific procedure either, for, paradoxically, the art of medicine can be conducted along purely scientific lines. Broadly speaking, medicine has been in turn a superstition, an art based upon empiricism and a science. These three aspects have all existed more or less side by side since the earliest times; but in the beginning the emphasis was down the scale—upon superstition—while today it is slowly moving up the scale towards science.

Superstition is far from banished, however, and as medicine gradually vacates that particular field the demand creates a vacuum which sucks in the charlatans to minister to the numbers who still prefer a little magic. Actually, every mode of approach has some value in the treatment of human beings, and the wise doctor will probably pander a little to superstition, make a lot of purely empirical observations, assess them scientifically and display his art in the judicious blend he prescribes in treatment.

I have said that an art can be practised scientifically; let me make that clearer. Never before has so much science been employed in medicine, and never before has medicine so freely acknowledged the debt it owes to science; yet I venture to assert that the amount of scientific thinking in medical practice is scarcely more in proportion today than it was in the Hippocratic era of 2300 years ago. The fact that medicine is more scientific does not make its practitioners so; we must distinguish sharply between science and the employment of science, for they are entirely different things.

Science, properly speaking, depends upon a state of mind—it is a way of thought which follows what has been called "the scientific method". This is the inductive approach of observation, experiment, generalization and verification. It embraces accurate observation and collection of facts, checking the facts by controlled experiment, developing a working hypothesis from the results and testing that hypothesis over as wide a range of conditions as is possible. This procedure, obvious as it seems, is the most rigorous discipline known to the human mind, and it is in truth encountered but rarely. Most of us prefer "spot diagnoses" and attractive generalizations from inadequate data, or we cling to plausible hypotheses in the face of adverse fact; for few of us have either the energy or the courage to put our beliefs to the risk of conclusive trial. Nevertheless it is only by inductive inference that new knowledge is born into the world; this is the way by which men have climbed to greatness in the past, that makes a Hippocrates, a Harvey, a Sydenham, a Pasteur the peer of the giants of today. Science is the same, and its results are equally valid, whether it is followed in a temple of Æsculapius, in an attic in Paris, by the bedside of the sick or in a modern laboratory. Not in the object pursued, nor in the place of pursuit, but in the mind which pursues according to the scientific method resides the true science. And the method is applicable to all branches of human learning.

At this stage you may well interpose by drawing my attention to all the science with which you are force-fed during your medical course, and to the number of scientific procedures—palpation, percussion, auscultation, pulse, temperature and blood pressure taking, urinalysis, hæmatology, blood chemistry, pathology, radiography, retinoscopy, bronchoscopy, cystoscopy, proctoscopy and the like—which you employ. But this is not science; it is only using tools that others have forged to extend your powers of observation. It is no more scientific than using the latest discoveries in electronics to send a telegram. Indeed, more scientific thinking beforehand would probably save your patients from much of this ordeal, for a great many of the examinations ordered are purely a confession of failure. In any case you are still only in the fact-collecting stage of your quest; the science can come in coordinating the facts with your patient's condition and in the choice of appropriate treatment. If your medical course has done no more than teach you what investigations to have made it has failed in the greater part of its task.

What, then, is its task? Not to make scientists of you in the generally accepted sense of the word, nor to stuff you with factual formulæ appropriate for every occasion, but to teach you to approach your problems in as scientific a manner as is possible. Thus you may hope to benefit yourself as well as your patients and may in time make lasting contributions to medical knowledge. Moreover, you will be in a position to assess the value of the endless procedures and therapeutics which flood the literature, and to detect the fallacies in claims based upon insufficient evidence. And while you will rightly view your fellows with a healthy scepticism you will not forget to extend that scepticism to yourself. Then you will be on the way towards conducting your art according to strictly scientific principles.

This end I take to be the major aim of medical teaching, and it is to achieve this end that after years of struggle medical training is becoming more and more closely associated with universities, which alone provide full-time teachers who are also scientists—fostering science and, more important, the scientific outlook. If that outlook is not imparted we as teachers have failed in our job, but the failure is not necessarily our fault, for there are two partners to any contract. In Australian universities as they are at present constituted, the educational requirements for entry to medicine are not particularly high, nor is any effort made to ensure that those who take the course are the best fitted for it. Every year we are faced with a new class of whom perhaps 20% are really interested in medicine and possibly 1% are interested in nothing else; the remainder take medicine because it is a gentlemanly—not to say glamorous or even lucrative—way of earning a livelihood, or because of parental pressure, or for some other reason. Our class is a cross section of the community and is essentially the same as any other cross section in its basic aspirations. This is a good thing in one way, since our graduates must, in their turn, ultimately deal with cross sections of the community; but it puts the teachers at a disadvantage, because the general community is not encouraged to think scientifically, or even at all; in consequence it becomes concerned with little else than getting through life as comfortably as possible. Six years at a university cannot undo the previous mental conditioning of three times as long, and it is scarcely a matter for surprise that so many students are indifferent to how much or how little science is taught, or that they regard examinations less as evidence of so much knowledge acquired than as so many milestones along the road to a licence to practise upon the public. They are the people

who can go through all the motions of a well-learnt drill of scientific procedure without an inkling of the underlying rationale and only the vaguest idea of what they are aiming at—much like the early convert to Listerism who washed his carriage wheels over daily with an antiseptic. Taking all things into account it must be set to the credit of your teachers that the general standard of medical practice and ethics is as high as it is, and that so relatively few lapse into quackery and exploitation. A lady once said that she often wondered where all the unpleasant medical students went to and all the charming young doctors came from. I like medical students, but it is good for you to learn how others regard you.

In view of my dismal remarks you might well ask—and many still do ask: "Is the result worth all the trouble? Wouldn't it be better to cut out all this scientific nonsense and concentrate upon more practical affairs by reverting to something like the old apprenticeship system?" We must all agree that it would not be difficult to teach a reasonably intelligent person most of the facts required by the average general practitioner in two or three years of intensive work. Such a person would be quite competent to cope with the everyday problems of medicine without any distracting doubts from anatomy, physiology, pharmacology, epidemiology or any other of the "ologies" with which students are at present bedevilled. That would be the attitude of the practical man. Why not?

In the words of Thomas Henry Huxley: "The practical man is the man who practises the errors of his forefathers." To elaborate: such a move would virtually freeze medical knowledge at its present stage of development and would throw us back to the atmosphere of veneration for the printed word. Once again our advances would depend upon the struggles of the mental giants, of whom there are pitifully few in any century. Medical progress would slow down to the pace of mediæval times, when all new ideas were branded impious, infamous, blasphemous, treacherous or with any of the other emotion-charged adjectives which serve the stereotyped mind as a substitute for thought.

But today, thanks to the training given in science and scientific thinking, the efforts of the few can be multiplied enormously by recruiting into scientific teamwork the pooled resources of numbers of the not-so-great, or even the mediocre. It is this, together with the generally increasing readiness to accept new ideas, that sets the modern era above all others. The number of really first-class minds is probably no greater in proportion than ever it was, but training permits second-class minds to make quite substantial contributions to knowledge. The discovery that first-class use can be made of second-class brains is the major achievement of this century; it has been responsible for our astounding recent expansion in science and amply justifies every effort to introduce as much science as is practicable into the medical curriculum. The proper course is, then, not to reduce the amount of science you have to learn, but to increase it. This does not mean an extra burden of facts for the already overloaded student; indeed, a better grasp of scientific principles would probably permit considerable reduction in the bulk of factual lore imparted. But it does mean fewer ex-cathedra pronouncements from the lecture theatre and more facilities and encouragement to learn by direct observation and properly controlled experiment. Realization of the fullest possibilities in this direction can come, however, only when every branch of medicine is taught from a university department having a full-time staff which enjoys adequate laboratory and clinical facilities.

So far, in our anxiety over our own salvation, we have neglected our partner in the business—the patient. Like the doctor, he is a representative of the general community and shares all its virtues and vices. And being human he prefers a magic potion to the often tedious and uncomfortable procedures of scientific investigation. He is quite prepared to pay lip service to science—which he regards as a kind of magic anyway—and positively enjoys a display of apparatus and mumbo-jumbo. Thus the administration of a nasty draught and an impressive display of sparks and coloured lights meets with the approval of all but the most critical. This is a fact that charlatans in every age have not been slow to appreciate.

You will probably find in the future, if you are honest with yourself, that the great majority of your patients would have recovered in any case, while a small proportion—perhaps 20%—would not have recovered without your attention. To take the last group first; these are the people whose lives and welfare really do depend upon the exercise of all the science and skill that medicine can afford, and it is to them that my remarks on scientific medicine are mainly applied. They are the patients who will give you the greatest satisfaction, for you will know that it is your skill that has "healed" them—that is, "made them whole" again. Of the rest, most will have some specific complaint which your attention can ameliorate or shorten, and there will be many whose physical disabilities are but an outward reflexion of some sickness of the mind. These are the people you will "care for" while the *vis medicatrix naturæ* makes them whole again—if it can. Here I would remind you that the word "cure" means only "to care for"; it has nothing to do with "healing" as such. You will, then, "cure" all your patients and may "heal" a fifth of them; the rest will be "healed" by Nature. You should appreciate, too, that however bravely they behave most patients are frightened people who bring their doubts and fears to you as one in authority, more for comfort, support and reassurance than for the exercise of a scientific skill which they take for granted anyway. The humanity this thought should evoke must form a necessary part of your professional armamentarium. To a sick person one doctor is much like another, qualifications are apt to be forgotten, and the most lasting impression the patient retains is of the kindness or otherwise with which he was treated. The most successful doctors, but not necessarily the wealthiest, are, other things being equal, the kindest.

One final word. Even the exercise of the most meticulous care will not save you from making mistakes when dealing with human individuals. Do not let this thought depress you unduly, for all doctors make mistakes—only the more experienced make fewer. Do not be too proud to acknowledge your errors, for science is humble enough to learn as much from those as from successes. You may cheerfully disbelieve the man who admits to no mistakes; and you may frankly despise him who seeks to make petty capital out of the misfortunes of his colleagues, when his proper thought—and yours—should be: "There but for the grace of God go I."

Reports of Cases.

PSEUDOXANTHOMA ELASTICUM.

By J. WITTON FLYNN and JOHN B. CAHILL,
Sydney.

THE condition of *pseudoxanthoma elasticum* is one of great rarity and interest. The following is a report of a recent case in Sydney.

Clinical Record.

The patient was a young woman, aged twenty-two years. She had resided in the country in Queensland since childhood and her general health had always been good. The condition first appeared at the age of four years and was first noticed on the right side of the neck, in the form of a raised linear and papular discoloration of the skin. This gradually spread round the neck, mostly in the lower part and anteriorly, and involved the left side. Somewhat similar appearances later were manifest in the axillæ. The condition gave rise to no symptoms and there was no history of similar trouble occurring in other members of the family.

On examination of the patient there was a fine network of raised interlacing strands with some small papular

lesions almost completely surrounding the neck, varying from a cream to a darker yellow in colour; these gave the skin a roughened or pitted appearance, well illustrated in Figures I and II. In the axillæ the condition took the form of thick linear bands, cream in colour, causing the

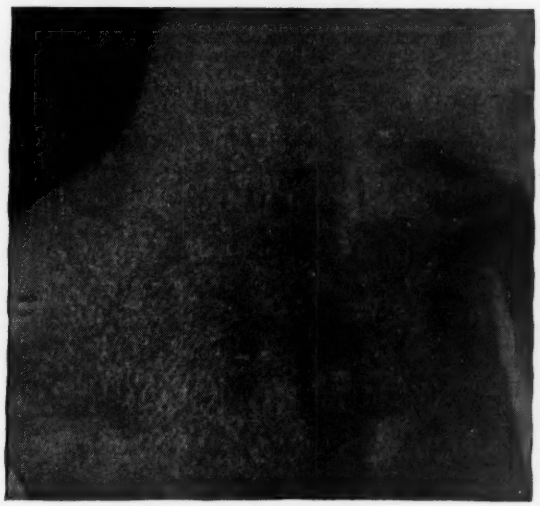

FIGURE I.

skin to lie in folds when the arm was not abducted. A similar condition, but less advanced, was present in both cubital fossæ. Palpation of folds of the skin gave one a sensation of loss of elasticity in all areas involved.

FIGURE II.

A number of investigations were carried out. The Wassermann and Kline tests produced no reactions with the blood. A blood count gave the following information: the hæmoglobin value was 14·5 grammes *per centum* (100%); the leucocytes numbered 5,700 per cubic millimetre, 56% being neutrophile cells, 38% lymphocytes, and 6% monocytes. The erythrocyte sedimentation rate was seven millimetres in one hour. The pathologist's report on a biopsy specimen (Figure III) was as follows:

The elastic tissue in the papillary layer of the dermis is normal, but deep to this the elastic tissue is swollen, granular and degenerate. The collagen is normal. The appearance is typical of *pseudoxanthoma elasticum*.

An ophthalmologist reported that the visual acuity was $^6/_6$ in both eyes, and that a few angioid streaks were present, most apparent near the right optic disk.

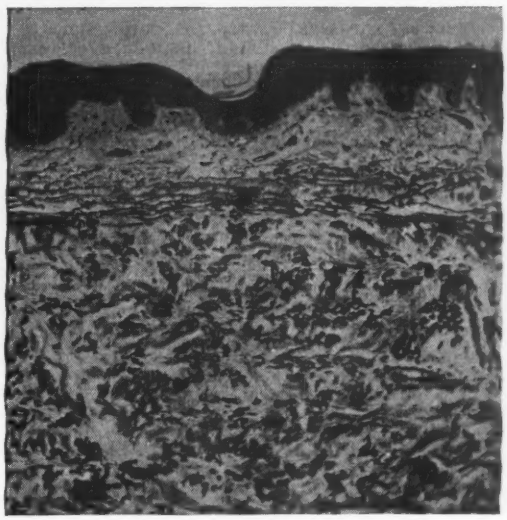

FIGURE III.

Comment.

It will be seen that this condition has a predilection for the flexures, is symptomless, and therefore has usually been present for a considerable period before being diagnosed. The presence of angioid streaks in the retina *is a feature, but occurs in only about 25% of cases.* Nevertheless many cases are first diagnosed after an ophthalmological examination, when the presence of angioid streaks is noted. The pathological report in this case is typical of microscopic changes occurring in *pseudoxanthoma elasticum*, which affects the deeper parts of the corium, although in some cases giant cells have been reported in and around the degenerated tissue.

Little is known of the ætiology and no treatment of the disease is of any avail.

Reviews.

CHILD HEALTH AND DEVELOPMENT.

THE present-day trend of studying the child in health is admirably exemplified by the book edited and in part written by Professor R. W. B. Ellis, formerly of Guy's Hospital, London, and now occupying the Chair of Child Life and Health in the University of Edinburgh.[1] It may be said to represent the English school. Very properly a wide view is taken of the subject so that in addition to surveying the physical aspects of growth and development, the book also deals with mental and social factors. Some may regret that modern specialization has called for no fewer than thirteen contributors to the symposium. True, the result cannot rival the writing of an Osler or a Robert Hutchison in either cogency or style, but this loss is offset by the wider variety

[1] "Child Health and Development", by various authors, edited by Richard W. B. Ellis, O.B.E., M.D., F.R.C.P.; 1947. London: J. and A. Churchill, Limited. 8½" × 5½", pp. 372, with illustrations. Price: 18s.

of knowledge presented. The book itself is divided into two parts. The first, dealing with problems of development, is almost twice the size of the second portion, which covers the social aspect of child health. Professor Ellis himself writes eight chapters on such subjects as "The New Born", "Feeding and Nutrition", "Puberty", "Infant Mortality", "Infant Welfare Schools", "Medical Services" and "Nursery Schools". Whilst these articles cover ground more or less familiar to pædiatricians and are a good summary of modern ideas, a few comments may be made. In regard to the newborn more attention might well be given to care of the premature infant. The subject of infant feeding, both natural and artificial, is admirably covered. The claims of Waller that by instituting massage of the breasts and expression of secretion during the latter months of pregnancy there was a significant diminution of engorgement, and that 83% of the instructed mothers successfully breast fed their infants for six months compared with only 42% in a controlled group, are of interest. It is, however, insufficiently stressed that even a failing breast supply can often be restored by suitable methods undertaken in a residential mothercraft hospital. In the chapter on artificial feeding it is somewhat surprising to read on page 105 that in estimating the caloric requirements of the baby, the use of the expected rather than the actual weight is not preferred. In this regard also mention might have been made of Grover Powers's contribution to this sometimes unnecessarily complicated subject in analysing successful artificial mixtures on a caloric percentage basis, rather than by the gravimetric scale. It seems surprising that this more sensible and accurate method has not by now replaced the older one. Professor Ellis's remaining contribution on the social side of child health gives a useful account of English practices. In the historical account of infant welfare work reference might have been made to the pioneering of Truby King, which though mainly antipodean, had some bearing on developments in other parts of the world. A chapter on nursery schools is a welcome addition, but it is hardly comprehensive enough, and more details of layout, equipment and methods of running might well be included.

Contributions by Professor Ellis's collaborators reach a high standard. The late Sir Joseph Barcroft writes an excellent account of "Functional Development of the Fœtus", summarizing his experimental findings recently published in "Researches on Pre-Natal Life". H. A. Harris, Professor of Anatomy at Cambridge and at University College, London, writes an admirable article on "Growth" with particular reference to development of the skeleton. This chapter contains much interesting material not found in the average textbook, and gives some idea of the immense complexity of this subject. Of interest is the very variable rate of organ growth with no trace of correlation with the ductless glands. Enthusiastic measurers may be disappointed to read that there is "no growth curve by which the individual child can be assessed". His remarks on skeletal age (page 153) are of considerable practical significance and indicate the value of classifying children and young adults by this means rather than by their chronological age. His account of spinal growth and function is also most informative. Concerning back exercises he writes: "Most of the exercises found in the handbook of physical training, if employed without due care and supervision, may tend to abuse the recently acquired and peculiarly human features of the spine. Toe-touching and trunk-twisting are fraught with danger, particularly at such ages and in such types of build as are characterized by relatively long legs and short arms. Mobility of the spine is largely an individual characteristic. The rough and tumble of ball games is less dangerous than squad drill or organized jerks." G. P. Wright, Professor of Pathology at Guy's Hospital, summarizes present knowledge on immunity. Whilst generally accurate, his account of whooping-cough immunization appears inadequate in that no mention is made of Phase 1 type vaccine, and his opinion that prophylactic immunization is of little or no value would not be supported in this country. Further informative chapters are contributed on "Ante-Natal Care", "Development of the Teeth", "Genetic Factors and Population" and other social aspects.

To many readers the most significant portions of this book will be those devoted to the child's mental development. Their inclusion is evidence of the growing belief that mind and body, as they constantly interact, are best studied together. Anna Freud, for some years domiciled in London, contributes two chapters, "The Establishment of Feeding Habits" and "Emotional and Instinctive Development". The first of these is complementary to Professor Ellis's article on nutrition and feeding, and deals fully with the many psychological factors that affect children in relation to food and eating. This is the best short account that has come to our notice, and should be read by all interested in child care. Her second chapter is also very good and gives a clear account of the strictly Freudian view of emotional development in childhood, with particular emphasis on sex. As she is her father's daughter, this is to be expected, but the uninitiated should be informed that many experts, whilst agreeing with much of Freud's teaching, do not accept the full rigor of his theories on infantile sexuality. Other instinctive drives vitally affecting self-development, such factors as aggression and inferiority, for example, receive little or no mention. In a textbook of this kind the views of other authorities should be considered. The book taken as a whole is of outstanding merit and a welcome addition to the subject of child health.

ALLERGIC DISEASES.

IT is a significant sign when a textbook on one specialty requires help from fourteen contributors for its completion. Robert Cooke, who has contributed to the literature on allergy for over thirty years and whose group in New York have made many notable discoveries, has at last written a textbook on the subject ("Allergy in Theory and Practice"), and the uniformly high standard through its 550 pages testifies to his profound knowledge of the subject and to his wisdom in his selection of the associates who deal with special aspects.[1] There is a tendency in some textbooks to gloss over difficulties, but here the tough problems are faced honestly, all the known facts are presented, and, when necessary, authoritative opinions are given by contributors of obvious experience. The most important sections are written by Cooke himself, but all the associate contributors maintain a high standard, and particularly notable chapters are contributed by W. C. Spain (non-infective asthma and allergic rhinitis), by Vander Veer (seasonal hay fever), by Grove (hyperplastic sinusitis), by Mathew Walzer (techniques of skin tests), and by Strauss and Spain (preparation of extracts).

A large textbook of this sort inevitably contains numbers of controversial points, and it is interesting to find Cooke throwing doubt on the theory that bronchiolar spasm is a factor in the production of dyspnœa in asthma associated with spontaneously developed allergy (he considers œdema of the bronchi and bronchioles and plugs of mucus are more important factors). In the foreword he makes a plea for more systematic teaching of these subjects to students and graduates and emphasizes the keenness for further instruction of practitioners who rapidly become aware of the prevalence of these diseases in general practice.

The book is of convenient size and the paper, print and illustrations are excellent and the bibliography is extensive.

This is one of the best books on allergic diseases that has been published and it will provide a mine of information for both general practitioners and students.

PASTEURIZATION OF MILK.

"PASTEURIZATION", by Harry Hill, F.R.San.I., A.M.I.S.F., F.S.I.A., Second Edition, 1947, is an excellent book for both the official and the distributor.[2] The chapters on "Plant Design", "Plant Inspection" and the "Laboratory" are particularly valuable and should be read by all those concerned in the supervision of a milk supply. The various methods of pasteurization are lucidly explained and technical details are set out in such a way as to be easily understood.

The author's comments regarding future developments are of particular interest. In his opinion the introduction of compulsory pasteurization is certain, and he points out that this will necessitate adequate trained personnel for the processing and trained inspectors to supervise the processing plants. He suggests that now is the time to expand educational facilities.

[1] "Allergy in Theory and Practice", by Robert A. Cooke, M.D., Sc.D., F.A.C.P., in association with H. S. Baldwin, R. Chobot, R. C. Grove, J. Harkavy, S Hebald, M. Heidelberger, P. Klemperer, L. Schwartz, W. C. Spain, D. D. Stetson, A. V. Veer, M. Walzer and M. B. Strauss; 1947. Philadelphia, London: W. B. Saunders, Company; Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" × 6", pp. 598, with illustrations, some of them coloured. Price: 60s.

[2] "Pasteurisation", by Harry Hill, F.R.San.I., A.M.I.S.F., F.S.I.A.; Second Edition; 1947. London: H. K. Lewis and Company, Limited. 8¼" × 5¼", pp. 304, with many illustrations. Price: 21s.

The Medical Journal of Australia

SATURDAY, JANUARY 17, 1948.

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THE TEACHING OF NUTRITION IN SCHOOLS.

EVERYONE who has given the subject any serious thought is agreed that people should know something about the value of food and how it should be prepared before it is served at table. Many will agree that the subject should be taught, but sometimes a curious attitude is shown when this teaching is discussed by educational and other departmental authorities who should be the first to apply to communal life the knowledge that has been gained in the science of nutrition. Though cooking is only one side of the subject, a certain official in a leading position declared: "Teach cooking! Why? My wife is a good cook, and she was never taught." The wife in question may have been one of those rare creatures who are born to be good cooks, or the husband's devotion to his wife may have helped him to forget the "burnt offerings" and "bloody sacrifices" that had confronted him from time to time in his early married life. When it is possible for such a remark as this to be made in all seriousness by a responsible administrator, there need be no surprise that the whole subject of nutrition is deprived of its rightful place in school education. Nutrition is a science and cooking, its handmaiden, is both a science and an art. At this point it will be well to point out that the preparation of food was mentioned in the first instance and not cooking. As we know that there is a time for everything under the sun, and as cooking is an art, we realize that there is a time to cook and a time when not to cook. This means that in the preparation of food cooking is not always necessary, and a watch has to be kept against the undoubted tendency that exists to lay too much emphasis on it. Since nutrition is a science we find that to its understanding we must bring first of all some knowledge of chemistry and physics, but also a grasp of the essentials of human physiology. From this it is clear that persons who claim to be, or are set up by educational departments as being, teachers or experts in nutrition should have to begin with some background of study of biology and human physiology, as well as training in chemistry and physics. How far these subjects should be taught to school children in connexion with the general nutrition and cooking sections of the domestic science course will be open to argument, and the decision will depend to some extent on the mental calibre of the children. It is certain, however, that they cannot be entirely neglected. What we may call catch-as-catch-can methods may sometimes be successful in the matter of cooking and indeed in the past were often the only methods used. It is probably true that this was the origin of the old saw that God sends good meats, but the Devil sends cooks.

The present position in the teaching of nutrition to school children is not satisfactory. According to Australian experience training in domestic science is too often the lot of the least intelligent school children. If a child is not considered bright enough for a classical education or a commercial course, domestic science is the refuge. This state of things obtains in other parts of the world and has been well described in the account of a conference on education in nutrition held under the auspices of the Nutrition Society at Glasgow in February, 1947.[1] J. M. Richmond pointed out that in junior secondary schools there were two types of course for girls, the commercial and domestic courses. There was an increasing tendency to encourage children in the higher categories to enter the commercial course, whereas those in the lower categories were almost automatically put into the domestic course. Richmond holds that this straightway puts domestic science in an inferior position and that herein lies the beginning of the community's domestic labour trouble—"We are sowing the seeds that grow into the conviction that domestic work is of the lowest order". The total number of girls in Glasgow schools classed as "postprimary" was stated by Richmond to be 17,328, and of these the number receiving instruction in cookery was 10,090, leaving a difference of 7,238. The 7,238 pupils with no cookery lessons were found largely among those taking academic courses. It is of interest to read Richmond's summing up of the reasons why domestic science is not included in all courses. Before this is done, his contention should be stated that for the younger age-group of girls, eleven to fourteen or fifteen years of age, the only satisfactory way of teaching nutrition in schools is along with practical cookery. First among his reasons is the traditional Scottish education which is predominantly academic and the racial unwillingness to make changes. Closely connected with this is the existence of too strong a connexion between wage earning and education. After all a child growing and preparing to enter on the struggle for existence should learn how to live a healthy life before he or she tries to master the ways of earning a living. Another reason is the lack of accommodation for the teaching of practical subjects such as cookery. Another speaker, J. Kirkland, described five schools in which he (or is it she?) had served in Glasgow; in only one, the last to be built, was a domestic science centre to be found. Richmond also complains (*a*) that curricula are so overcrowded that academically minded headmasters can easily crowd out domestic subjects; (*b*) that the Scottish Education Department itself gives sanction to courses which do not include cookery; (*c*) that education

[1] *The British Journal of Nutrition*, September, 1947.

is too much divided into compartments and courses and that a child has to fit into one or other of these courses. When we look at the list of reasons stated by Richmond we do well to ask ourselves how stereotyped we have all become in our outlook, whether the conditions stated by him apply to the centres of educational activity in Australia, and then what we can do about it all.

At the bottom of the whole matter lie our conception of the purpose of education and, indeed, our ideas of the art of living. Ideally we educate our children so that they may live full and useful lives. In Australia at present we can do more in the matter of nutrition than others in the Old World can attempt. While we do what we can to help the stricken peoples in other countries, we owe it to our own future generations to make them fit to withstand the "slings and arrows" that "outrageous fortune" may hold for them in the future. But this is perhaps a trespass on the premises accepted at the beginning of this discussion. In regard to the actual teaching of nutrition something will be accomplished if educational authorities will (where it is not done) give the subject equal value with other subjects in the school curriculum and in the assessment of examination results. There is no doubt that an effort should be made to include a course on nutrition with practical cookery classes in every large school controlled by the State. Richmond at Glasgow mentioned girls only, but other speakers included the boys and there is a lot to be said for this, even as far as cooking is concerned. Accommodation will be a difficulty in many places. Until this has been overcome and even afterwards, a change of attitude on the part of teachers of science will at least turn the attention of children to domestic matters. Two examples may be quoted. When chemistry classes are being taught the facts about carbon dioxide, mention may be made of the part played by it in the baking of bread. And when the Bunsen burner is explained, reference need not be confined to its use in the laboratory or in industry, but the gas stove may be explained and its use in cooking mentioned. The same thing may be done in a hundred and one different ways and always the domestic side of life and work treated in a natural and even laudatory way. Until such time as full accommodation can be provided for the adequate teaching of domestic science, with the art and science of cookery, teaching by word of mouth should be given to all students, and school curricula rearranged to this end. It can be done. In the doing of it, ministerial heads of departments should see to it that progress is not impeded by men in high places whose executive actions are curbed by their conviction (or delusion) that their wives are good cooks.

Current Comment.

PROBLEMS OF EARLY INFANCY.

THE directors of the Josiah Macy, Junior, Foundation of New York have sought to base its activities on the wish of the donor that they should be more interested in the "architecture of ideas than in the architecture of buildings". To this end they have encouraged the conference method for furthering scientific investigations. The belief is that, if a few well-trained people meet informally to exchange ideas and to discuss problems and unsolved issues, more practical results will come from the discussion than from the type of conference which depends upon formal presentations. In March, 1947, a group of 24 people, pædiatric teachers, child psychologists and psychiatrists, were brought together from various centres at the expense of the foundation to discuss problems of early infancy with emphasis on the part played by the mother-child relationship in the development of personality. The transactions[1] of the conference are most interesting, even if they are a trifle bewildering in places.

Four members of the conference, including the chairman, Leo H. Bartemeier, were foundation members of the Cornelian Corner which has been operating in Detroit for the past five years. The Cornelian Corner takes its name from Cornelia, mother of the Gracchi and daughter of Scipio Africanus the Elder, who was renowned for her devotion to the upbringing of her children and for the very successful way in which she educated them to devote their lives to the welfare of the people. Its members are concerned at the "trend toward national decadence" in the United States seen in the alarming increase of admissions to mental hospitals since 1880, in the high proportion of persons rejected for service in the recent war, because of nervous and mental disorders (rural 51%, urban 41%), and in the threefold increase in the incidence of neuropsychiatric casualties in the combat zones during the Second World War compared with the First World War. They believe that it is necessary to follow the Taoist exhortation to make the beginnings correct, to clear out the source if they hope to cleanse the current of the stream. They wish "to develop new attitudes and apply new practices in preventive psychiatry" and to bring their objectives and their programmes to the attention of "all progenitors of tomorrow's generation".

The first subject of discussion at the conference was a plan for the interchange of ideas between a prospective mother and father and a pædiatrician trained in psychiatry. The parents can thus be instructed in matters of neonatal child hygiene and development before the birth of the child; an essential part of the plan is, however, that the pædiatrician should be both a listener and an adviser. The adoption of the method at the New York Hospital has already produced encouraging results. Encouragement of breast feeding, on the "permissive" basis of feeding whenever the mother feels that the baby is hungry or anxious to be fed, received a good deal of support. Breast feeding has been discarded to an extraordinary degree in the United States according to statements made and there seemed to be a general desire at the conference to correct this. It is rather amusing, however, to see the way in which Truby King methods were regarded. In American life compulsory tuberculin testing of herds, compulsory pasteurization of milk in bulk before delivery and facilities for refrigeration in the average home are inclined to be taken for granted. As a result the force of some of Truby King's arguments for breastfeeding was rather lost on the conference.

"Rooming-in" called for a good deal of discussion and several reports were given of its practice. The term refers to the method of allowing the mother and baby to live in the same room in hospital, the mother attending to the baby's needs as far as possible; the father and near relatives are given free access to them. Administrative difficulties were considerable in some hospitals and there were obvious objections, but the idea was much favoured.

A thoroughly frank discussion also took place on the avoidance of planned care or artificial "baby-training", emphasis being laid on the potential harm that may result from deliberate "toilet-training" during the stage of "autism" (*sic*) before "normal maturation".

The whole trend of the thought of the conference seems to have been away from excessive discipline and artificiality in the training of the small infant. Many provocative, but constructive, ideas were put forward, though it is difficult at times to follow the exact meaning of the technical jargon and the American terminology.

[1] "Problems of Early Infancy", edited by Milton J. E. Senn; 1947. New York: Josiah Macy, Junior, Foundation. 9" × 6", pp. 70. Price: $0.75.

The psychiatrists in particular seem to clothe simple ideas in heavily concealing folds of bizarre expressions and erudite phrases. For example, the extension lecturer in gynæcology and obstetrics innocently asked why children should not be subjected to "toilet-training" before the age of eighteen months. The gentleman from the Institute of Human Development informed him that

> training before physiologic maturation may interfere with or distort the development of homostatic mechanisms before they have become well established. There is some evidence to show that in the infant each physiologic function is at first in static equilibrium; when this equilibrium is disturbed, there is only a very gradual return to normalcy while the characteristic reaction of mature homeostasis is a rapid counter-effect. If the child is trained before normal maturation, these physiologic mechanisms may be distorted.

This appears to be a modern paraphrase of "let nature take its course", a philosophy probably acceptable to most infants and certainly acceptable to the people who run "diaper services". However, in various forms, simple and obscure, and in varying degrees this attitude recurs throughout the report of the conference. It is probably the inevitable pendulum swing from a tendency to reduce the management of infants to a formula. Perhaps the pendulum may swing too far; but sooner or later common sense will make it clear that an infant growing up into a civilized community is to be regarded neither as a wild animal in the jungle nor as a clockwork doll.

PENICILLIN AND SULPHONAMIDE IN THE TREATMENT OF MENINGOCOCCAL MENINGITIS.

THE tendency to displace the sulphonamides with antibiotic agents is fairly general. In a good many cases this is quite sound, but sometimes it seems to be just a matter of following the fashion. The relative value of the sulphonamides and penicillin in the treatment of meningococcal meningitis has recently been the subject of special investigation in Scotland.[1] The subcommittee responsible for the investigation reported in 1944 on the use of sulphonamides in the treatment of meningococcal meningitis, one of their principal findings in that report being that, even with apparently adequate treatment, the fatality rate of the disease remained high at the extremes of life. On this basis they considered that the results of the treatment of the disease in young children would provide a general criterion of the treatment's value. In this investigation 62 patients under the age of six years suffering from meningococcal meningitis were treated with penicillin or a sulphonamide (usually sulphathiazole) in alternate order by the time of admission to hospital. This was subject to variation, as, if a patient had received treatment before admission, the drug already used was adhered to; in addition, the treatment was in certain cases changed because of the patient's failure to show any improvement. Penicillin was given both intrathecally and either intramuscularly or intravenously at first, but for later patients reliance was placed entirely on intrathecal injection. The sulphonamide was given intramuscularly on admission and then orally. A comparison was made between 35 treatments with penicillin and 31 treatments with sulphonamide. Penicillin failed to effect a cure in 11 cases and sulphonamide failed in five cases. All other factors likely to influence the result were considered, but in most cases the two groups were homogeneous in relation to the particular factor or its importance could be ruled out on other grounds. Two factors, however, called for special comment—those relating to age distribution and to the duration of the illness. The group treated with sulphonamide contained an excess of children aged less than one year compared with the group treated with penicillin. As the earlier investigations of the subcommittee had made it clear that less satisfactory results from sulphonamide could be expected among children under the age of one year than among older children, this adds weight to the apparently superior results obtained from the use of sulphonamide. To say the least, there was no evidence that penicillin was in any way more effective than sulphonamide, and it was probably less effective; clinical impressions supported this finding.

The second fact on which the members of the subcommittee comment is the longer duration of the illness (5·9 days) of those under the age of one year compared with that (3·2 days) of those over the age of one year. They were unable to demonstrate with certainty that this was a factor in the higher mortality in the young child, but consider it sufficient grounds to warrant emphasis on the importance of early diagnosis and treatment. They suggest that it is not sufficiently appreciated that, even in non-epidemic times, the first year of life contains an undue proportion of meningococcal infections. Therefore they consider that in this age period earlier recourse to lumbar puncture as a diagnostic measure in patients presenting equivocal signs and symptoms should receive greater encouragement "for it is only by a determined effort to attack the disease in this period of life that we can hope further to reduce mortality".

The subcommittee is continuing its investigations into combined treatment with penicillin and sulphonamide. It was used in a limited number of cases during the present investigation and the results suggested that it was superior to the use of either drug alone. The numbers were, however, too small to warrant definite conclusions and a considered verdict will be given after further trial.

[1] "Cerebro-Spinal Fever", Report by the Infectious Diseases Subcommittee of the Scientific Advisory Committee on a Comparison of Penicillin and Sulphonamide Treatments of Meningococcal Meningitis in Young Children; 1947. Edinburgh: His Majesty's Stationery Office. 9¼" × 6", pp. 13. Price: 4d.

URETERAL CATHETERIZATION.

IT is just fifty years since catheterization of the ureter, today an essential procedure, became readily practicable. A. Puigvert[1] has published a tribute to Joachin Albarran, who, in 1897, invented a deflector, a lever device for directing the course of the ureteral catheters by means of the cystoscope. In doing this Puigvert has supplied an interesting account of the difficulties previously experienced by urologists. There was no reasonable means of assessing the state of the individual kidneys, so that nephrectomy, which was recognized as being otherwise practicable and indicated in many conditions, was always a gamble. The first attempts to obtain urine from the individual kidney were based on the idea of occluding the opening of one ureter and collecting the urine that subsequently drained into the bladder. One device was a lithotrite-like instrument designed to grasp and compress the ureteral orifice and intramural part of the ureter; another consisted of a rubber bag on the end of a catheter, the bag to be filled with mercury and pressed against the ureteral orifice. These methods were only sometimes successful and at best only allowed the collection of urine from one ureter. Various types of "segregator" were then introduced which divided the bladder into two parts, but these too were disappointing. The importance of ureteric catheterization was realized. Simon, of Heidelberg University, dilated the female urethra and guided a catheter into the ureter with his finger. Howard Kelly, of Baltimore, passed a catheter into the ureters of the female by means of a tube and reflected light. These methods were, however, difficult, and even a number of ingenious ideas based on the cystoscope introduced by Nitze failed to meet the need. Then, in 1897, after further improvements in the cystoscope, Albarran devised an instrument with a deflector at the distal end of the catheter canals, consisting of a lever very much like a finger, which was controlled by a screw at the ocular end of the instrument. This, the *unita* ("little nail") *de Albarran*, made it easy to guide the catheter into the ureter. It was immediately adopted and has been incorporated into most instruments since then. It was one of the great triumphs of urology, as Puigvert observes, and revolutionized urological practice.

[1] *The Urologic and Cutaneous Review*, September, 1947.

Abstracts from Medical Literature.

PÆDIATRICS.

Prophylaxis against Ophthalmia Neonatorum.

H. CHARLES FRANKLIN (*The Journal of the American Medical Association*, August 9, 1947) compares the value of penicillin and silver nitrate in the prevention of ocular infection of the newborn. A total of 1710 infants was studied in the first two weeks of life. The solutions used were a 1% solution of silver nitrate, which has to be made up freshly each day, and a solution of the crystalline sodium salt of penicillin containing 2500 units per millilitre, made up once weekly and kept refrigerated below 59° F. A single instillation of silver nitrate was made at birth, but, because penicillin is only bacteriostatic, it was felt necessary to use four instillations, one each day on the first four days of life. The results obtained favoured the use of penicillin. The presence of pus in the eyes was only one-third as frequent, and the development of redness of the conjunctiva, swelling of the eyelids and watery discharge was much less frequent in the penicillin group. From his study the author concludes that penicillin prophylaxis is to be preferred because danger of permanent injury to the eye is eliminated; instillation of the solution is not painful; ocular abnormalities are less frequent during the first days of life; the solution of penicillin does not need to be made freshly each day (deterioration of silver nitrate with formation of irritating substances takes place rapidly); an excess of the solution may be used if desired; the solution may be used for both prophylaxis and treatment.

Mongolism.

THEODORE H. INGALLS (*American Journal of Diseases of Children*, March, 1947) presents the first of two sections of a study of mongolism, in which he discusses its pathogenesis. He reviews the accepted abnormalities found in the mongol and summarizes the features found in fifty autopsies performed at the Children's Hospital in Boston. In addition to the constant and essential features of moderate microcephaly, definite brachycephaly and relative dwarfism of the basilar skull bones and the contiguous glabellum, nasal bones and maxilla, the short wide brain with relative dwarfing of cerebrum, cerebellum and brain stem and the well-known facial appearances, there are a wide variety of less constant features. These include deformities of the heart, most commonly patency of the interventricular or interatrial septa, deformities of the fingers and toes, such as shortening, webbing or absence, deformities of the ears, opacities of the ocular lens and abnormalities of the palate and alimentary tract. The author considers that the association of such varied lesions calls for explanation. He points out that the damaging influence must act in the period between preembryonic and early embryonic life, particularly between the sixth and ninth weeks of intrauterine life, the period when anomalies susceptible of embryological orientation appear to arise. He suggests that noxious influences during this period may produce any one or any combination of the abnormalities described above, and the skull, brain and facial features of mongolism may or may not be included.

THE same author (*American Journal of Diseases of Children*, August, 1947), in the second part of his study, seeks to find a cause for the anomalies that constitute mongolism. From the epidemiological aspect he has found several factors recurring repeatedly in the pregnancy histories of mothers of mongols. Advanced age of the mother is common. Hæmorrhage, threatened abortion and certain infections including rubella occurring about the eighth week of intrauterine life are strikingly common. Abnormalities of the uterus such as retroflexion, prolapse or myomata are more frequent than among mothers of normal children. From the teratological aspect the author points out that the differentiation of the widespread structures that may be affected in the mongol is beginning in the eighth week of the embryo; it is not surprising to see them associated if mongolism is in fact caused by a variety of noxious influences acting during this period. Experimental and clinical evidence in animals and humans suggests that lack of oxygen to the fœtus may be an important mechanism; the importance of temporary starvation and accumulation of toxic metabolites is yet to be evaluated.

Congenital Hypertrophic Pyloric Stenosis.

R. MCLAREN TODD (*Archives of Disease in Childhood*, June, 1947) reviews a series of 112 cases of congenital hypertrophic pyloric stenosis treated in two English hospitals over an eight-year period. Diagnosis was based on a history of projectile vomiting, constipation and usually loss of weight, and on the presence of visible gastric peristalsis and a palpable pyloric tumour. In one year the diagnosis was confirmed radiologically. In all cases medical treatment was used and five patients were submitted to Rammstedt's operation after a trial of medical treatment. The author points out that a review of the literature shows that results of medical and surgical treatment are about equally good, and stresses that in either form of treatment a strict routine and skilful nursing are very important factors. His patients were given breast milk or half-cream dried milk at three-hourly intervals in the volume and strength for normal babies. "Eumydrin" (1 in 10,000 aqueous solution) was given half an hour before each feed, the dose being initially three millilitres and increased to four, five or six millilitres if vomiting continued. Dehydrated babies were given subcutaneous injections of glucose in saline solution. Stomach washouts were given twice daily until there was no gastric residue, a number five Jacques catheter being used with attached tube and funnel; about two and a half ounces were given at a time until about two pints had been used. The solution contained two ounces of normal saline solution in two pints of water. If constipation was severe a bowel washout was given each third day. If vomiting was excessive before admission, ammonium chloride (two grains three times a day) was given to combat the alkalosis. Of the 112 patients 12 died; the most striking feature of this group of twelve patients was dehydration and low birth weight. In discussing the best method of treating pyloric stenosis the author insists that two principles apply to any method, namely, that the babies should be nursed in single cubicles to minimize cross-infection, and that they should be breast fed if possible. He discusses Jacoby's claim that surgical treatment should be used if the vomiting has commenced in the second week of life or earlier or if the baby is severely dehydrated, but should not be used in the presence of infection or diarrhœa; and that medical treatment should be used if the vomiting has started late or has continued for three weeks without severe dehydration, but should not be used in the presence of dehydration or hæmatemesis. The author thinks that the age of onset is unimportant. He states that medical treatment should be used as a routine in most cases, but that surgery is indicated if the baby's birth weight is below six and a half pounds or if it is severely dehydrated, or if medical treatment is ineffective after seven days' trial. He agrees that obvious infection is a contraindication to surgical treatment.

ORTHOPÆDIC SURGERY.

Flexor Tendon Grafts to the Finger and Thumb.

WALTER C. GRAHAM (*The Journal of Bone and Joint Surgery*, July, 1947) points out that, when the flexor tendons have been cut, there is loss of both the pinch and hook mechanisms of the fingers as well as of the ability to grasp and to hold objects. He states that there is no reason to attempt to restore flexor tendon function to a finger which has no sensation, because there is a tendency for the patient to substitute a finger with normal sensation in preference to using the one which has been grafted. To restore function to a finger requires tremendous effort on the part of a patient, and he must use the finger to regain the tendon action. The author draws conclusions from experience gained in 141 flexor tendon grafts. In a severely scarred finger, fusion of the distal interphalangeal joint and a tendon graft only as far as the middle joint are preferable to a full tendon graft. The little finger is the most difficult finger in which to restore flexor tendon function with a graft; few people, however, use the little finger a great deal in the ordinary function of the hand. The finger joints should move as freely as those of a normal finger before a graft is attempted. The most accessible donor structure is the tendon of the *palmaris longus* when present. On many occasions it is desirable to substitute a muscle from another finger for the motor power. This is particularly true in the presence of laceration of long standing when advanced atrophy of the muscle is secondary to the laceration. The *flexor sublimis* tendon of the ring finger may be used as motor power for the index finger, middle finger or thumb when there is much atrophy or damage to their natural muscles. The author states that the most important part of flexor tendon grafting comes after the surgery has been completed. It is his policy to splint the hand and wrist for a period of twenty-one days; then the

splinting is removed and moderate active motion and full passive motion are instituted, care being taken not to extend the fingers fully. After four weeks moderate resistive exercises are instituted; after six weeks flexion against resistance is encouraged. The technique of freeing the flexor tendon graft in its newly formed sheath is extremely important. Each joint should be held individually and forceful active flexion should be encouraged. Forceful extension is also necessary to prevent fixed flexion contractures. This should not be carried out before the end of six weeks, as there is danger of tearing the distal attachment of the tendon. Operative tendolysis by stripping the tendon after six or seven weeks often restores more function. On occasions the distal attachment of a flexor graft will pull loose, and if this happens a regrafting operation should be performed immediately.

Symposium on the Intervertebral Disk.

ATHUR G. DAVIS (*The Journal of Bone and Joint Surgery*, April, 1947) found, from eighty-four replies to a *questionnaire* sent to 250 patients whom the author had treated for protruded intervertebral disk, that 62 patients had returned to their former occupations and 18 had changed their occupations; 90% had been relieved of their sciatica. The remaining 10% had recurrences of low back pain. The recurrences were usually at an interspace other than the one found to be involved at the former operation. The author states that experience with the frequency of recurrence in cases in which fusion was not carried out, the fact that protrusions occur largely in the two lowest intervertebral spaces, and the high frequency of unstable lumbo-sacral junctions have convinced him that in most cases, if not in all, operation should include posterior fusion from the fourth lumbar vertebra to the sacrum. Approximately one hundred and fifty consecutive cases have been treated in this manner and recurrences have been practically eliminated.

Calcified Medullary Defects in Bone.

ALBERT BARNETT FERGUSON (*The Journal of Bone and Joint Surgery*, July, 1947) states that calcified medullary defects of bone appear as solitary, rounded areas, made up of irregular nodules of amorphous calcification, in or near the metaphyseal regions of the long bones. They are frequently located in the centre of the medullary cavity and are of variable size—usually one to two centimetres in diameter. When these areas are larger, they are likely to be confused with caisson disease in bone. The nodules are of even calcific density. The periphery of the lesion reticulates with the normal bone lines, but is sharply demarcated from normal bone structure. There is no central area of lesser density and no shell of calcification. There is no expansion of the shaft of the bone and lesions do not extend into the cortex. The fact that this lesion is symptomless helps to distinguish it from the following diseases in which other pathological changes are involved: caisson disease of bone, chondrodysplasia, osteoid osteoma, sclerosing osteogenic sarcoma, osteoplastic prostatic metastases, bone infarcts. There is no evidence that this lesion is expansile or has any power of autonomous growth, and it cannot be classed as an enchondroma. Its location is in keeping with other cartilaginous disturbances of bone formation; and, as an example of faulty development of bone from cartilage, it may be classified as one of the many forms of chondrodysplasia. The author considers that the pathological and clinical findings lead one to the conclusion that this lesion is a degenerated calcified island of cartilage, which did not progress to complete ossification at the time of skeletal growth. The solitary, non-symmetrical nature of this lesion supports the contention that trauma may be an ætiological factor. Rickets may also be mentioned in connexion with this lesion.

The Cut Flexor Tendon.

J. B. KINMONTH (*The British Journal of Surgery*, July, 1947) discusses the technique and publishes results of 21 operations on severed flexor digital tendons. He considers that primary suture is indicated only in very exceptional circumstances when operation is possible within four hours of a clean cut and when a graft is not considered necessary. A free graft, usually of *palmaris longus*, should be used in all cases of flexors cut within the digital sheath. The remnants of the severed tendons lying within the digital sheath are removed and the graft is inserted into the resulting tunnel so that it extends from the distal phalanx (where it is attached) up as far as the middle of the palm, where it is anastomosed to the proximal portion of one of the cut tendons. Internal fixation of the anastomosis is obtained by using fine stainless steel wire. Success is unlikely if there is preexisting joint stiffness or if the patient is old. In most cases the patient is ready for operation three weeks after the injury, unless sepsis follows the initial wound excision when secondary operation is not persisted with until several weeks after infection has been eliminated. The author describes his operative technique in detail and states that active range is usually perceptible in the interphalangeal joints in the third month after operation. Improvement goes on for a long time in these cases and progress may still be observed many months after an initially slow response. In the author's series there were four failures in 21 operations. On reviewing the failures he concluded that there was only one where no definite avoidable reason for failure could be found. In three cases there was 100% recovery of function; in the remaining successful cases the degree of recovery varied from 60% to 95%.

Painful Interdigital Clavus (Soft Corn).

E. J. HABOUSH AND R. V. MARTIN (*The Journal of Bone and Joint Surgery*, July, 1947) state that basically the principle of the conventional operation of partial resection of the fourth metatarso-phalangeal joint in the presence of painful interdigital soft corn is the removal of the normal underlying bone impinging upon the skin. The same effect can be attained more logically, however, by removing the overlying pathological skin of the affected toes and, by a simple skin flap, advancing the web distal to the underlying impinging normal bone. This operation has been performed on twenty toes. All results were gratifying. In one case necrosis developed in the flap; but the area became epithelialized and the web remained advanced. After excision of the soft corn on the fifth toe, a skin flap is turned up on the lateral aspect of the fourth toe, being based distally; this is sutured to the distal edge of the skin from which the clavus has been removed. Three interrupted silk sutures are sufficient for this step of the operation. The free dorsal edges of the wound on the fourth and fifth toes are then sutured together and to the free dorsal edge of the skin flap, forming a Y closure. On the sole of the foot, from the base of the fifth toe in the lateral reentrant angle of the still open plantar wound, an incision, three-quarters of an inch long and extending proximally, is made. The skin flap is then undermined and mobilized, thus simply effecting a closure of the plantar defect. The authors consider that, after this operation, there is no possible danger of recurrence. In their experience it offers distinct advantages over the conventional operation.

Metacarpal Reconstruction.

WILLIAM LITTLER (*The Journal of Bone and Joint Surgery*, July, 1947) states that in selected cases of metacarpal fractures with loss of bone substance bone grafting is a worthwhile procedure for relieving pain at the fracture site and for restoring the normal architecture, strength and function of the hand. Forty-four patients have had metacarpal grafting with a total of 56 individual grafts. As many as three grafts have been placed at one time. Individual grafts have been used for each metacarpal. Clinical union and callus formation, with loss of the sharp line of demarcation between the graft and the fragments, have resulted during the third month in all grafts except three. The author states that it has been possible in several cases to utilize bone from an amputated finger to restore a metacarpal defect. The author considers that the general principles obtaining for grafts of the larger bones are also applicable to grafts of the metacarpals. However, because of their small size, fixation by plate or screws is usually impractical and must be compensated for by more attention to the finer details of "bone carpentry". In general, the success of the operation is in direct proportion to the accuracy with which the graft has been fitted to the recipient metacarpal or carpal fragments. Additional fixation, when desired, can be obtained by the use of stainless steel wire or pins, which can be transfixed into adjacent uninvolved metacarpal or carpal bones. The author has found that, if only the head of the metacarpal remains, it can be stabilized by extending the graft into the carpus; if only the base remains and the digit must be preserved, the graft can be fused to the proximal phalanx at 30° flexion. Early immobilization of the injured hand in the position of function is of great value in the later procedures of reconstructive surgery. The author describes in detail the technique for insertion of the graft. Following operation, a plaster of Paris cast is applied, which extends to the proximal interphalangeal joints, the hand being maintained in a position of function. On the twelfth day a new cast is applied, immobilizing only the grafted metacarpal and the proximal phalanx.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, East Melbourne, on November 12, 1947, DR. A. E. COATES, the President in the chair.

The General Practitioner and the Specialist.

DR. LESLIE HURLEY read a paper entitled "The General Practitioner and the Specialist" (see page 66).

DR. F. KINGSLEY NORRIS opened the discussion by saying that out of the wealth of his clinical experience Dr. Hurley had given the words of caution which were essential; confidence in clinical findings should be instilled into students and in post-graduate lectures. Dr. Norris said that in his wards at the Alfred Hospital, he had a little group of patients with miliary tuberculosis undergoing treatment with streptomycin and he had noticed that some of the students and doctors who were following the progress of the patients were concentrating undue attention on the skiagrams, rather than on the clinical condition of the patients. During his service in the Army as an administrator he had had occasion to check over-investigation of patients by regimental medical officers when located near a general hospital. He had instructed them to have confidence in their own investigations and to make their decisions as to the disposal and treatment of the patient on that basis. He was in complete agreement with Dr. Hurley in his advocacy of the paramount importance of the taking of case histories personally and the carrying out of clinical examinations meticulously.

Dr. Norris referred to the fact that in the second part of the paper Dr. Hurley had discussed the humanities of medicine; the patient whether he was a child or an adult should not be forgotten as an individual whilst the medical attendant was chasing after shadows in X-ray films, which after all might be meaningless. Dr. Norris recalled that at one centre visited during his recent tour abroad he was present at a clinical meeting at which the patients were brought into the room, but there was quite a gathering of the members of the audience around the viewing boxes making decisions and forming opinions on the display of skiagrams; few of them bothered to make any examination of the patients. He saw a seven-year-old child brought in with the others and found the child to be free of signs or symptoms apart from the skiagram. There was a relative opacity in a portion of the chest area in the films displayed and the patient was being retained in hospital awaiting the disappearance or development of the shadow. Dr. Norris formed the opinion that the child had had pneumonia and had recovered, and when asked his opinion he had suggested the advisability of discharging the patient from hospital before he became ill.

Dr. Norris went on to say that no intelligent or successful physician could carry out his medical work without applying a knowledge of psychology and psychiatry; those arts were by no means the prerogative of specialists. The paper was timely and intensely valuable for all present.

DR. LINDSAY VERRIER said that in Fiji he had perforce to practise without laboratory aids and simply had to rely on history taking and clinical examination; it was refreshing for him to be present to hear Dr. Hurley emphasize the importance of those methods. If they had medical aids it would be so much the better, but he had learned from his experience that even without them he was able to supply the needs of his patients.

DR. W. OSTERMEYER expressed great appreciation and enjoyment of the address and his general agreement with the points made by Dr. Hurley. It was deplorable that patients were sometimes looked upon as laboratory animals.

DR. KEITH HALLAM, after expressing appreciation of the address, said that there had been a time when the eliciting of physical signs was brought to the pitch of perfection, especially in the examination of the chest, and if nothing was found to be wrong it was usually because nothing was wrong. Then came the era when further evidence could be obtained by radiography and that evidence was overstressed in some circles. He had risen that evening to protest against what he thought was the prostitution of films. Clincians when supplied with X-ray films could not possibly be aware of all the variable conditions under which the film under discussion might have been prepared. The report from a trained radiologist took quite a large number of technical points into account and was offered as an opinion as to what he personally thought about the films. Obviously, if the clinician supplied the radiologist with the pertinent facts of the history and main clinical findings, the opinion given might well be sounder, as he would be able to express his views on the study of the patient and not merely on a set of shadows. He commented that the young medical graduate nowadays was efficiently trained and had excellent acumen, presumably because during his training he had access to data supplied from the pathological laboratories and the radiological departments, in addition to the information he could collect for himself from the patient's history and from observation of the clinical signs.

DR. ROY WATSON said that he hoped that the laboratory work was not the base deceiver that Dr. Hurley had portrayed to them. It had been necessary, of course, for Dr. Hurley to stress the dangers and to show that radiological and pathological reports should be used to confirm or to amplify opinions arrived at chiefly from history taking and clinical examinations. It would be a great improvement if specialists and consultants could be supplied with a carefully prepared *résumé* of the case history after the style of the brief supplied to the barrister by the solicitor.

DR. GERALD WEIGALL, senior, said that he had been delighted to be present to hear Dr. Hurley and agreed with all he had said. During his long experience as a medical practitioner he had found it of the utmost value to take a keen personal interest in each patient and to find out from him what he did, whether he was an employer or an employee, and whether he had a hobby. Many people were ill because they disliked their occupation or, if the patient was an employer, he was inclined to work too hard and often needed alcoholic stimulation to keep him going. Dr. Hurley had described for them what in fact the dying race of general practitioners used to do in the community.

DR. W. E. WILSON questioned Dr. Hurley about the attitude the practitioner should adopt when all the evidence seemed to point to an organic basis for a cardiac pain, though from the progress of the condition the course of an organic lesion did not seem to be followed.

DR. COATES, before calling upon Dr. Hurley to reply, thanked him very warmly for what in his opinion was the best evening they had had for years. The subject had been handled capably by one of themselves who was recognized as a worker steeped in medical lore. Dr. Hurley was one of the ablest physicians in Australia and his life work was an inspiration to all who came in contact with it. If it was to be the fate of the profession to join a public service with a forty-hour week they might no longer be entitled to be called workers. They would probably run around carrying bundles of papers, signing death certificates, and when asked what was wanted would merely be able to say that they required more cemeteries. True workers could be found in all ranks of life; he knew of a railway employee who had to chop wood and dig a garden at the week-ends to provide for himself a satisfying outlet for his energy. Dr. Coates said that he was able to testify that Dr. Hurley was a worker because Dr. Hurley had been his corresponding physician at the Royal Melbourne Hospital since 1935 and could always be relied on to solve satisfactorily any problem placed before him. He performed that onerous work in addition to conducting an enormous private practice with outstanding ability.

Dr. Hurley, in reply, thanked those who had referred to him in such extravagant terms and the members of the audience who had listened to him so patiently. He found Dr. Wilson's question a difficult one to answer, but presumed that Dr. Wilson was referring to what Dr. Hurley had come to classify as "coronary spasm". The coronary arteries might be a little thickened with hypertension present and the patient might have the attack of pain over the centre of the heart of a cramping nature that lasted three or four hours. It usually yielded to tritnitrin therapy, though it was liable to recur. If the pathological basis was regarded as being a spasmodic state of the artery, which was temporary and not a permanent occlusion, it nevertheless formed an organic basis for the symptoms. If the balance of probability favoured the postulation of an organic lesion it was the doctor's duty to diagnose an organic lesion, but, in a situation such as Dr. Wilson had described, it was sensible and considerate to the patient to explain that the consequences would not necessarily be dire or incapacitating.

A MEETING of the New South Wales Branch of the British Medical Association was held at Sydney Hospital on September 18, 1947. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Pulmonary Tuberculosis.

DR. W. L. CALOV showed a married woman, aged twenty-three years, who had come under observation in January,

1943, when she applied for X-ray examination as a contact of her father, who was suffering from tuberculosis. X-ray examination was repeated in July, 1943, July, 1945, and July, 1946. On the last occasion mottling suggestive of a tuberculous lesion had been noted in the upper zone of the left lung field. Tubercle bacilli were found on microscopic examination of the sputum. The erythrocyte sedimentation rate was increased. Artificial pneumothorax had been induced in August, 1946. A good initial result was obtained, and no adhesions were noted. On September 17 a small amount of fluid was noted. On September 24 she complained of severe pain in the chest, which had commenced the day after her last refill (September 17). She had been shivering and feverish. Examination revealed a temperature of 101·6° F. and rapid pulse and respiration rates. Signs of hydropneumothorax were apparent. It was thought that she had either pneumonia or tuberculous empyema resulting from rupture of an adhesion containing lung tissue. She was readmitted to hospital that day. Sulphadiazine was given. The leucocyte count the following day was 7500 per cubic millimetre. Neutrophile cells numbered 68%, eosinophile cells 1%, lymphocytes 16% and monocytes 15%. The fever was of the hectic type, rising to 102° F. or 103° F. in the afternoon and falling to normal in the morning. The pulse rate was consistent with the fever, rising to 120 or 130 per minute at night. Sulphadiazine therapy was suspended on September 30, and the administration of penicillin was commenced. The fever and tachycardia and dyspnœa continued. On October 2, 1946, a pneumothorax needle was inserted into the pleural cavity through the second intercostal space in the pectoral region. The intrapleural pressure was found to be positive. It was concluded therefore that if rupture of the lung had occurred it had now healed. If the opening was still patent a reading of ± atmospheric pressure should have been recorded. Twenty-five ounces of pale yellow, sticky, murky fluid were removed by aspiration through the eighth intercostal space in the mid-axillary line, and air was allowed to flow in and out through the pneumothorax needle. One hundred thousand units of penicillin were injected into the pleural cavity. The hectic fever continued at a lower level. On October 10, sixteen ounces of opaque yellow fluid were removed and 100,000 units of penicillin were injected into the pleural cavity. The same procedure with regard to air replacement was employed. From that time onwards she had improved. The temperature slowly subsided and became normal by October 22. On October 14 the leucocyte count was found to be 15,200 per cubic millimetre, of which 79% were polymorphonuclear cells. Incubation of fluid removed on October 10 produced a culture of acid-fast organisms morphologically indistinguishable from *Mycobacterium tuberculosis*. The pneumothorax was lost because of the rapid development of adhesions. The patient was discharged from hospital on November 19, 1946.

Dr. Calov commented that the patient had been desperately ill for about three weeks. She was in pain; she had high fever; and she became terribly weak and breathless. It was probable that an adhesion had ruptured after her refill of September 17. A tuberculous empyema had resulted. She had made a good recovery. Her weight was 29 pounds more than before the induction of pneumothorax. The X-ray appearances did not suggest active disease. The left costophrenic angle was obliterated and the lower part of the left field was dull; a fibrotic lesion was apparent in the left subapical region; the left hemithorax had narrowed slightly.

Endocrine Dysfunction.

Dr. Calov next presented a married woman, aged thirty-three years, who had come to the out-patient department complaining of abnormal growth of hair on the face over a period of eighteen months. She had one child, aged eleven years. She had not menstruated since her confinement. During the preceding eleven years her weight had increased by four stone. Micturition was frequent. On examination she was found to have a profuse growth of facial hair. The body and limbs were also abnormally hairy, and the pubic hair had a masculine distribution. She was very obese. The back was slightly bowed. The systolic blood pressure was 170 millimetres of mercury and the diastolic 120 millimetres. The deep reflexes were exaggerated. X-ray examination of the skull showed the pituitary fossa to be small but regular. X-ray examination of the lumbar and dorsal regions of the spine showed no abnormality. A glucose tolerance test revealed a normal blood sugar curve. The excretion of 17-ketosteroids in twenty-four hours was estimated at 25 milligrammes.

Dr. Calov said that when the patient was first seen a tentative diagnosis of Cushing's pituitary-cortico-adrenal syndrome had been made. Further investigation tended to refute that diagnosis and to suggest ovarian neoplasm. Exploratory operation was under consideration.

DR. S. DEVENISH MEARES, who carried out the gynæcological examination, commented that the patient's menarche had occurred at the age of fourteen years. Menstruation was always infrequent—usually about every forty-two days, with a normal loss lasting five days. She had been married for thirteen years and had one child, aged eleven and a half years. The pregnancy and confinement were normal and she had fed the baby at the breast for eight months. There had been amenorrhœa for eleven years. On vaginal examination the vulva and clitoris were normal. The cervix was hypertrophied, the os was transverse, and the epithelium covering the cervix was intact. The uterus was postaxial and anteverted and slightly enlarged, with a cavity three and a half inches long. In addition the uterus was firm and its contour smooth. The night following the vaginal examination there was bleeding "like a period". Four days later, by means of an endometrial biopsy curette, some fragments of endometrium were obtained, and much to the surprise of the operator there was expelled through the cervical os a cylindrical polypus one and a half inches long and half an inch in diameter. The histological picture of the endometrium showed glands lined by columnar epithelium in places several layers thick. Many of the glands were dilated and cystic. There was no secretion in the glands. The stroma was cellular. In the polypus the picture was similar; but in areas away from the base there was much œdema and hæmorrhage, till in the lower half cell structure was degenerate. Usually in Cushing's syndrome there was stated to be a depression of gonadal function. The amenorrhœa might have suggested that in the patient under discussion; but the enlarged uterus with a cavity three and a half inches long containing hyperplastic and proliferative endometrium and the formation of an endometrial polypus all pointed to the reverse. No ovarian tumour had been felt on vaginal examination, but owing to the fatness of the patient a small tumour might have escaped detection. Opportunity might present itself later for examination under anæsthesia.

Dr. Calov's next patient was a saleswoman, aged twenty-two years, who stated that she had had a very high blood pressure a few years previously. Menstruation had commenced at the age of nine years. It was regular for two years. From that time the menses occurred irregularly late. Sometimes the interval was many months in duration. Eight months previously the flow had lasted for sixteen days. Menses occurred in each of the next two months. She had had amenorrhœa since. She stated that she was thin as a young child, but at eleven years had started to become fat. She was continuing to grow fatter. The weight increased more rapidly during times of amenorrhœa. She became very thirsty at times. She did not suffer unduly from headache. She had had no previous illness of any severity. Her maternal aunt was an elderly diabetic. On examination she was found to be obese. The skin of the hips and shoulders was marked with atrophic striæ. She had a profuse growth of facial hair. The distribution of pubic hair was of the male type. The systolic blood pressure was 170 millimetres and the diastolic 100 millimetres of mercury. The glucose tolerance test yielded blood sugar values of 170 milligrammes *per centum* (fasting) and, in successive half-hours after ingestion of glucose, 318, 320, 282 and 262 milligrammes *per centum*. The urine contained sugar. X-ray examination showed no abnormality of the *sella turcica* or of the frontal bones. Early spondylitis of the thoracic region was noted. No abnormality was found on X-ray examination of the renal tracts. The visual fields were not constricted. The excretion of 17-ketosteroids was estimated at eighteen milligrammes in twenty-four hours on July 23, 1947, and ten milligrammes in twenty-four hours on August 13, 1947.

Dr. Calov said that the patient's weight had diminished by eight pounds as a result of dieting during the two months of her attendance at the diabetic clinic. The sugar content of the urine had diminished. Cushing's pituitary-cortico-adrenal syndrome had been considered as a possible diagnosis, but it was thought that the history was too long. It was probably a mixed-gland dystrophy, the gonads playing the most important part.

Emphysema.

Dr. Calov then presented a male patient, a locomotive engine driver, aged sixty-two years, who had worked in a very dusty job carting coal to bunkers at a private siding for many years. He had suffered from pneumonia twenty-five years before. He had been subject to bronchitis every winter for many years. Lately he had become very breath-

less. On examination he was slender, emaciated, weak and breathless. His skin had a cyanotic tinge. Early clubbing of the fingers was present. His chest expansion was very poor. The percussion note was hyperresonant. The breath sounds were distant. The pulse was rapid. X-ray examination showed widening of the intercostal spaces, a tendency to horizontal disposition of the posterior parts of the ribs, increased transradiency of the lung fields, streaky shadows of the upper and lower zones of the right lung and the lower zone of the left lung, cyst-like areas at the base of the left lung, and dilatation of the pulmonary arteries. In oblique views the cyst-like appearances were accentuated.

Hemihypertrophy of the Face.

The next patient shown by Dr. Calov was a married woman, aged forty-two years, who stated that she had been born with a tumour of the left side of her face and a double tongue. The tumour hung to her shoulder. In 1923 Dr. Archie Aspinall had removed the tumour in Sydney Hospital. She was quite well before and after the operation until one night when she fell downstairs. The left side of her head was injured. Ever since then she had been liable to sudden pains in the left ear, passing up into the temple and lasting ten minutes. The pain had been present off and on for two weeks. She had no vomiting or visual disturbance. Menstruation had commenced at the age of seventeen years, and was still regular and normal. No other members of her family had had a similar tumour. She had four children. On examination her physique and nutrition were good. Great swelling of the left side of the face and great hypertrophy of the left side of the tongue sharply limited at the mid-line were noted. The buccal surface of the cheek bulged into the oral cavity. The swelling was not like a hæmangioma. Hair was profuse on the left side of the face. X-ray examination of the skull showed an old fracture of the left articular ramus of the mandible with sclerosis of the temporo-mandibular region. Her facial pain had disappeared after a few days of mild sedation. A search of the records showed the following report on the histological examination of the tumour removed in 1923: "The epithelium is somewhat thickened and the deeper layers show some increase in pigmentation. There is an increase in the amount of fibrous tissue. Otherwise the skin appears normal." Dr. Calov remarked that it should be noted that no mention was made in the report of tissues deep to the skin. However, it seemed certain that if the mass resembled a lymphangioma or hæmangioma some mention would have been made of that either in the clinical notes or in the pathological reports. A diagnosis of facial hemi-hypertrophy was made.

Diabetes Mellitus, Polycystic Kidneys and Hypertension.

Dr. Calov's last patient was a widow, aged fifty-three years, who had reported at the diabetic clinic in March, 1947, stating that she had been found to be a diabetic two years before. Her weight had increased by one stone in the previous twelve months. She suffered from swelling of the legs, palpitation, and aching of the knees, ankles and back. She had not bothered about her diet for two years. She did not suffer from polyuria. No family history of diabetes was obtained. On examination both kidneys were palpable. The systolic blood pressure was 240 millimetres and the diastolic 110 millimetres of mercury. The retinal veins were nipped at the arterio-venous crossings. The fasting blood sugar content was 188 milligrammes per 100 millilitres. The figure rose to 263 milligrammes one hour after glucose injection and was 225 milligrammes two hours after glucose. Retrograde pyelography showed the appearances of polycystic disease of the kidneys. The patient was having a diet with a caloric value of 1500, and was doing well.

Urinary Tract Tuberculosis.

DR. ALBAN GEE and DR. C. E. MARSHALL presented a demonstration on the diagnosis of urinary tuberculosis.

Dr. Gee, in discussing the clinical aspects, emphasized that early diagnosis was the key to successful treatment, and was possible only as a result of full urological investigation. Too often patients were seen when urinary distress was quite considerable, and as a rule those were in an advanced condition. Frequency of micturition in a young person should always be checked by a microanalysis and bacteriological investigation of the urine, and, if pyuria was present, an excretion urogram carried out. Sterile pyuria should be further checked by cystoscopy and often by retrograde pyelography. That was sometimes the only way by which an early renal lesion could be detected. Hæmaturia as a presenting sign was not so common, but it did occur. It might take the form of a few drops at the end of micturition, as when the bladder was the source, or give the urine a smoky appearance if pus cells also were present. At times its appearance was periodic, with clear urine in the intervals; that was usually associated with early conditions amenable to treatment. Retrograde pyelography together with examination of urine from each kidney would usually localize the source.

Dr. Gee also pointed out the necessity of fully checking the origin of a dull lumbar ache or of heaviness in the loin. He showed films of a patient, aged forty-six years, who had complained of these for some years, together with some mild frequency of micturition. An excretion urogram revealed numerous areas of caseation and cavitation with calcification and loss of function on the right side. The left kidney appeared healthy to all tests and a right nephrectomy had left the man with sterile clear urine.

X-ray films were shown depicting an early lesion in an upper calyx, with pinching off of the major calyx, and the characteristic irregular and moth-eaten appearance of the minor calyces. Films were shown also of the renal tracts in a case of tuberculosis of the spine of a girl, aged twenty-two years. Acid-fast bacilli and pus cells were found in the urine, but the films revealed only some shagginess and slight distortion of the calyces on both sides. Such films, without other data, could be difficult to differentiate from those found in pyelonephritis.

Finally Dr. Gee stressed the fact that repeated examinations of the urine for acid-fast bacilli in twenty-four-hour specimens were required, and in doubtful cases a guinea-pig should be injected.

Dr. C. E. Marshall assisted Dr. Gee in the demonstration of specimens and sections illustrating tuberculosis of the renal tract, and outlined the main features of the laboratory diagnosis.

(*To be continued.*)

Post-Graduate Work.

POST-GRADUATE COMMITTEE IN MEDICINE OF THE UNIVERSITY OF ADELAIDE.

PROGRAMME FOR 1948.

THE Post-Graduate Committee of the University of Adelaide announces that the following courses have been arranged for 1948.

Overseas Lecturer for 1948.

The Australian Post-Graduate Federation in Medicine has invited Professor J. C. Spence, Professor of Child Health, Durham University, Newcastle, to visit this country in 1948 as guest lecturer. Professor Spence has accepted this invitation and will give three lectures on pædiatric subjects in Adelaide, probably in August.

Courses for Higher Degrees.

Suitable for M.R.A.C.P. Candidates.—A twelve-weeks full-time course in medicine will be held beginning on February 2. This course has been advertised previously and further details and syllabus may be obtained from the Medical Secretary.

Suitable for M.S. Part I Candidates.—This course will begin on February 9. It will consist of: (i) 44 lectures in physiology given between 9 and 10 a.m. in the Physiology Department on Monday, Tuesday, Thursday and Friday each week, and (ii) 61 lectures in anatomy given in the Anatomy Department at 4.30 p.m. five days a week. The fee for the course is 25 guineas. Applications, accompanied by cheques, should reach the Medical Secretary by February 1, 1948.

Suitable for M.S. Part II Candidates.—A further series of lectures in advanced surgical subjects, advanced surgical case taking and applied surgical pathology will be given, commencing on Monday, February 16. The surgery lectures will be given on Monday afternoons at 4.30 p.m. in the Institute of Medical and Veterinary Science. The advanced case demonstrations will be held on Tuesday afternoons at 4.30 p.m., when the class will meet the demonstrator in the Surgeons' Room, McEwin Building, Royal Adelaide Hospital. Lectures in applied surgical pathology will be given in the Institute of Medical and Veterinary Science on

Thursday afternoons at 4.30 p.m. The majority of the latter lectures will be given by surgeons. All three series of lectures will be continued for twelve weeks, and, should the number of candidates warrant it, probably at intervals throughout the year. The fee for this course of lectures is £15 15s. A detailed syllabus may be obtained from the Medical Secretary. Applications accompanied by cheques should reach the Medical Secretary by February 1, 1948.

Course Suitable for D.G.O. Part II Candidates.—A course suitable for D.G.O. Part II candidates will be held probably in July, August and September if there are three or more applicants. This course will be advertised again in 1948.

Refresher Week Course.

Because the course held in 1947 was considered such a success, both by this committee and by the graduates who attended it, it has been decided to hold a similar one in 1948. This course will be held during the university vacation in May. Further details of the course and of the E. C. Stirling Lectures, which will be delivered during this week, will be published later.

Week-End Courses.

Obstetrics.—A week-end course will be held at the end of the Refresher Week in May.

Pædiatrics.—A week-end course in pædiatrics will be held during July.

Medicine and Surgery.—A subject of interest to both physicians and surgeons will be selected to be dealt with in the week-end course in October. Programmes for these courses will be published during the year.

Post-Mortem Demonstrations.

Post-mortem demonstrations will be carried on by Professor Cleland and staff. The first demonstration for 1948 will be on January 28, at 3.30 p.m., in the Institute of Medical and Veterinary Science. Thereafter demonstrations will be held each Wednesday afternoon. The fee for a series of twelve demonstrations is £3 3s.

Course in Applied Surgical Anatomy.

A course similar to the one held in 1947 will be delivered by Dr. J. R. Barbour. It will consist of twelve lectures at 4.30 p.m. on Thursday afternoons in the Anatomy Department, starting on September 6. The fee for this course is £3 3s.

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR FEBRUARY, 1948.

THE Melbourne Permanent Post-Graduate Committee announces the following programme for February, 1948.

Course in Cardiology.

A course in cardiology, under the direction of Dr. H. Hume Turnbull, will be conducted at the Royal Melbourne Hospital at 2 p.m. as follows:

Tuesday, February 10.—"Anatomy and Physiology of the Coronary Circulation", by Dr. T. E. Lowe (or substitute).

Friday, February 13.—"Active Treatment of Coronary Thrombosis", by Dr. W. McI. Rose.

Tuesday, February 17.—"Pulmonary Vascular Disease and Congestive Cardiac Failure", by Dr. K. Grice.

Friday, February 20.—"Congenital Heart Lesions Susceptible to Surgical Treatment and their Diagnosis", by Dr. H. B. Kay.

Tuesday, February 24.—"Diseases of the Mitral Valve", by Dr. M. C. Davis.

Friday, February 27.—"Disease of the Aortic Valves", by Dr. F. J. Niall.

The fee for the course is £3 3s. It is the first of a series arranged as suitable for M.R.A.C.P. and M.D. II candidates. The series includes courses in thoracic diseases, gastro-intestinal conditions, including liver disorders, pædiatric disorders, endocrine disorders, blood disorders and renal disorders.

Applications for enrolment, accompanied by the fee, should be made with the Secretary not later than two weeks before the start of a course. Those accepted for the Commonwealth Rehabilitation Training Scheme in 1948 may attend free of charge.

Week-End Course at Ballarat.

A week-end refresher course at Ballarat will be held on February 21 and 22:

Saturday, February 21, *at* 2.30 *p.m.*—"Surgery of the Biliary Tract", by Mr. J. Grayton Brown.

Saturday, February 21, *at* 8 *p.m.*—"Early Diagnosis of Pulmonary Tuberculosis", by Dr. Eric Clarke.

Sunday, February 22, *at* 10 *a.m.*—"The Management of Acute Gynæcological Emergencies", by Dr. R. G. Worcester.

Sunday, February 22, *at* 2 *p.m.*—"Persistent Vomiting in Infants and Failure to Thrive", by Dr. R. Southby.

The course will be conducted at the Ballarat Hospital and the fee is £2 2s. Enrolments should be made with Dr. C. E. Richardson, Sturt Street, Ballarat.

Correspondence.

PROMINENCE OF THE EYES IN FATHER AND DAUGHTER.

SIR: Mr. H., aged thirty-two years, has protruding eyes which are not only bizarre, but his neighbours feel some abhorrence to look upon him. He is above average intelligence, is a farmer and was a member of the "Home Guard". He assumes, and is given, leadership among his fellows, who are no longer conscious of his oddity.

He is the father of a normal daughter, aged seven years, and a daughter of five years who has inherited the prominent eyes.

The case is reported firstly because the symmetrical abnormality appeared in the father and was inherited in the daughter, circumstances which may be of general interest; secondly, because I am unable to answer the father's questions about the subject and would value advice that any of your readers might care to give for his, and my, information. These questions are: (i) The likelihood of the father transmitting the condition to any further children. Hamilton Boyd and Mostyn in "Human Embryology" quote, on page 105, Murphy: "in a family possessing a malformed child, the birth of a subsequent abnormal child occurs with a frequency about 24 times that for the general population". (ii) If the daughter has children, will she transmit the

disfigurement in the next generation, or may it be passed by, to reappear in subsequent generations, and, if so, would it be transmitted by any law, as by the female line, to appear in the male?

The father of Mr. H. died at sixty-five, cause indeterminate. The mother is alive; she has diabetes. Mrs. H., senior, had eight sons (two of whom are like twins) and a daughter. These children are all healthy. She had also a son, an achondroplastic dwarf. Mrs. H., junior, has had two miscarriages since the two daughters, mentioned above, were born. The daughter of five years with the disfigurement, like the father, is intelligent and has normal vision.

Yours, etc.,

Balaklava, South Australia, October 28, 1947. E. A. JOSKE.

THE DEVELOPMENT OF OBSTETRICS AND GYNÆCOLOGY.

SIR: I am grateful to Sir William Fletcher Shaw for his interesting comments on the several points mentioned in my letter. As I am responsible for the teaching of medical history in the University of Sydney, I felt in duty bound to have my mind cleared of any misconceptions which might be in all innocence passed on to the students. I am, therefore, most appreciative of the references quoted by Sir William, and will take the first opportunity of consulting them if they should be available in this country.

However, I continue to be unaffected by any qualms of conscience for having drawn attention to the misquoted date, 1880; and I am still left in the dark as to the actual meaning that passage was meant to convey. Nor do I yet feel any pangs of regret for having rushed with emotional fervour to the rescue of that renowned pioneer ovariotomist, Spencer Wells. I must have been unduly impressed by statements I had encountered in back numbers of *The Lancet*; and to give one example: "In 1858 Mr. Spencer Wells began that series of improvements in attention to details in operating and after-treatment which gave rise to his unprecendented success and established the operation on a permanent footing" (Buchanan, November, 1874). Then again, if Professor Simpson went to Manchester to see Charles Clay operate, many hundreds must have visited London to witness the doings of such notorious ovariotomists as Frederick Bird, Baker Brown and Robert Lee. As far as I am aware Simpson made no efforts to popularize this daring surgical feat over the border, and Mr. Baker Brown went all that way from London to perform his special parlour trick which was regarded by *The Lancet* (October, 1862) as a rather unique occasion. Indeed, the Scots have always been noted for their caution!

In his letter Sir William makes this statement in reference to Charles White and puerperal fever: "It was only in 1848 that Semmelweiss in Boer's old hospital rediscovered the same truths." This still leaves me unconvinced, as it is difficult to make any comparison between Professor Boer's long and successful *régime* at the General Hospital in Vienna and the modern outlook on medical science emanating from that hospital in Professor Klein's day. When Semmelweiss, in 1844, first decided to specialize in obstetrics and became provisional assistant at the First Obstetric Clinic, an entirely new *régime* was being ushered in by Skoda, Hebra, Rokitansky and Kolletschka, who became close friends, collaborators and supporters of Semmelweiss. At that time great emphasis was placed on the importance of pathological anatomy, which included a use of the improved microscope, as essential to the proper diagnosis and treatment of disease. Unfortunately the new clinical methods were indirectly responsible for a steep rise in the maternal mortality, which so affected the young assistant physician that he at once determined upon a course of action. He thereupon made a thorough investigation of the position, marshalled his facts carefully, and correlated them with his own observations and experiences in the wards and post-mortem room. At last he was able to form a clear outline for his doctrine on the ætiology and prevention of puerperal fever; and one of the greatest obstacles to its immediate acceptance was the implacability of the "contagionists", whose vague ideas were predominantly English, and had been introduced to Vienna in the previous century by Professor Boer.

It devolved upon Ferdinand Hebra in December, 1847 (not 1848), to give the first clear exposition of the new truths about sepsis and antisepsis; and they were made applicable to all open wounds whether in obstetrics, gynæcology or general surgery. Furthermore, may I voice the humble opinion that the epoch-making researches carried out by Semmelweiss in the face of unrelenting persecution were no more related to puerperal fever *per se* than were those of Professor Lister to the great scourge of hospital gangrene.

Now that I have so fully unburdened my mind, I promise not to make any further demands upon your valuable space, but will make a strategic retreat to my study where I shall reflect in solitude upon the writings of White, Gordon and Oliver Wendell Holmes. I think it was Cervantes, of immortal fame, who observed that of all Satan's imps, the Scribbling Demon is the most irresistible; and I am worried about the possibility that I, too, like the object of his scorn, might have mistaken "possession" for "inspiration".

Yours, etc.,

Parramatta, New South Wales, December 26, 1947. K. MACARTHUR BROWN.

PSYCHOSOMATIC MEDICINE.

SIR: As a teacher in psychiatry I feel it incumbent on me to make some comments on the discussion which followed the two excellent papers which were presented to the New South Wales Branch of the British Medical Association on September 25 last.

Clearly the teaching of the psychological aspects of somatic symptoms must be the responsibility of physicians and surgeons rather than of psychiatrists. The student may be told about these things by the psychiatrist, but unless the general physician calls attention to the temperaments of his patient and how somatic symptoms may be the reflexion of the patient's anxiety and of difficulties in his life, and indicates the extent to which treatment is directed towards the alleviation of these distresses, the student will continue to carry away the impression that the duty of the general physician is only to the physical, whereas all things mental or emotional are matters for the psychiatrist.

One speaker referred to attendance at case conferences as an alternative to "lectures on psychoses and psychoneuroses involving unintelligible terms". The conference of physicians, attended also by social workers and lay psychologist, is, of course, instructive to all concerned, including the pre-graduate student, provided that he has already some theoretical and clinical grounding in psychological medicine. How often do physicians meet in consultation over a case in the general wards under the honorary system? And if the lecturer uses unintelligible terms, surely it is up to the brighter and more independent-minded of the students to say so!

The Committee on Psychological Medicine of the Royal College of Physicians, London, has suggested that the student should attend some fifty-three lectures, demonstrations and discussions in the course on psychiatry, as well as spend three months in the psychiatric department (in- and out-patients) of a general hospital, concurrently with work in the department of neurology and other special departments, and that he should during this period write up at least six cases of psychosis and twenty of psychoneurosis. The committee also recommends that domiciliary visits should be paid under the supervision of a psychiatric social worker. A short resident appointment in a mental hospital or observation ward is also advised during the last clinical year. Very good! But we shall have some three to four hundred students in each clinical year in Sydney in the near future. However, a vacation spent as an attendant or nurse in a mental hospital would be a valuable experience. The General Medical Council, no doubt having in mind the difficulties of any considerable extension of instruction in psychiatry in many medical schools, has advised, "During his study of all clinical subjects, the attention of the student should constantly be drawn to the importance of the interrelation of physical and psychological aspects of disease", and also that instruction in psychiatry should be carried out mainly (but not exclusively) in "a psychiatric out-patient department where neuroses and psychoneuroses can be studied". But while these minor mental maladies form such a large part of general practice there is an obligation on every practitioner also to know a little about the psychoses and related medico-legal matters.

There will be no real progress in the teaching of psychiatry to the student until time and facilities are provided for more clinical work, that is, case-taking, to an extent approximating to that demanded in general medicine. Demonstrations have a limited value, for the onlooker has little appreciation of the technique by which the facts presented with the patient have been ascertained. Nor does the psychiatrist usually care to bare the patient's ego before

an audience with the freedom with which the physician discusses viscera before a wondering class. Yet the technique of examination of a patient is the foundation of all clinical practice, psychiatry included. Here I might add that it is hardly fair to the Post-Graduate Committee in Medicine in the University of Sydney to say that it has not as yet "done anything in the teaching of psychological medicine to general practitioners and others". But I would suggest that attendance at lectures and demonstrations which are included in the courses for general practitioners might most usefully be supplemented by attendance at a psychiatric department (or a phychosomatic department if there is such a thing) where the examination, treatment or disposal of cases referred by general practitioners can be discussed with the psychiatrist. In his reply Dr. Edwards made perhaps the most practical contribution to the whole discussion when he said that it was necessary in the out-patient department to teach the student one-twentieth formal psychiatry and nineteen-twentieths the approach to the ordinary patient. The psychiatric out-patient department at present provides the only facility for the student to apply what he has heard and seen in lectures and demonstrations until more attention to psychological aspects is demanded in the medical and general wards of the teaching hospitals.

Yours, etc.,

Sydney, January 5, 1948. W. S. DAWSON.

Obituary.

THEODORE AMBROSE.

WE are indebted to Dr. H. Baldwin Gill for the following account of the career of the late Dr. Theodore Ambrose.

The death of Dr. Theodore Ambrose on October 8, 1947, at the age of sixty-seven years, is a sad loss indeed to his contemporaries and to those of the younger generation in Perth who served under him as junior "residents". He played an important part in the capacity of honorary surgeon for many years at the Perth (now Royal Perth) Hospital and the Children's Hospital. Indeed he was senior surgeon at each of these institutions at the date of his retirement. He taught, by precept and example, generations of young men who all immediately realized their good fortune in being privileged to "sit at his feet", and every one of whom ultimately came to feel for him the most affectionate esteem.

After qualifying from the University of Sydney in 1902, he spent three years at the Sydney Hospital, filling the positions of junior "resident", pathologist and assistant superintendent. He then came to Western Australia, where he accepted a goldfields appointment for a period before setting up in practice in Subiaco, about two miles from the Perth General Post Office. This was in 1905; and it was soon after this that I first met him. In 1909 we were closely associated in adjoining practices in a rapidly growing suburb. From then until 1916, when he relinquished general practice and began his real life work as a consulting surgeon, one had every opportunity of admiring his work and, incidentally, of learning to love the man.

I think all who knew him will agree that apart from his innate craftsmanship, his knowledge of the principles of surgery, and his extremely thorough grounding in pathology, his deafness—for he was an otosclerotic—constituted a not inconsiderable factor in the success he made of the dual role of good surgeon and good comrade. His disability seemed to emphasize his natural modesty without in the least detracting from his gregariousness. Perhaps the example of his wife, who always insisted in translating everything to him, was partly responsible for the feeling we all had that Theodore must always have someone at his side to keep him posted. His delight in being included in every conversation was immense. In the operating theatre his deafness was an asset—his attention was never distracted.

In the hard days of general practice, with impossible roads and comic-opera motor-cars to contend with—much more unrestful and unreliable than the old "horse and buggy" days—with private hospitals few and far between, no deep drainage, theatres and sterilizing facilities very unsatisfactory, he still contrived to do all his own surgery; and what is more to the point his results were uniformly good. His patience and dexterity made him extraordinarily skilful in block dissections of cervical and axillary glands. His work in this type of case was reminiscent of that of the late Sir Harold Stiles. The long-term results of his radical mastectomies are a tribute to his meticulous care.

He is survived by his wife who has throughout his professional life been his loving and inseparable companion as well as his ears. Four daughters and three sons are also left to mourn his loss. One daughter and one son are practising medicine in Western Australia. There are sixteen grandchildren.

He had an extensive circle of intimate friends and loved company. He will be mourned by hundreds of patients throughout the State. He was an enthusiastic member of the Western Australian Turf Club.

Ill health in 1938 made it appear almost certain that his period of useful work was over. His indomitable courage and will to live, however, enabled him in the first year of the war to act as ship's surgeon on a vessel carrying explosives to the United Kingdom. This proved, incidentally, to be an exciting voyage as the ship next in line in the convoy was sunk by enemy action.

In the following year he undertook an appointment as medical officer to the cable station on Fanning Island,

arriving there in the same week that saw the bombing of Pearl Harbour. He served two years on Fanning Island. His wife accompanied him on this (for a man of his age and indifferent health) quixotic adventure. He undoubtedly enjoyed a feeling of justifiable satisfaction in the knowledge that he was freeing a younger man for more active service. Since his return from the Pacific he spent a year in a goldfields practice, another year in a more accessible country practice, doing work in both during a period of acute shortage of available medical men. For the last six months of his life and up to within a week of his death he had been granted the joy of being with his youngest son in his first practice since his discharge from the Australian Army Medical Corps.

The passing of our dear friend "Tig" Ambrose will not soon be forgotten. His wife and family can be assured of the warmest sympathy from the whole medical fraternity in Western Australia.

Dr. D. D. Paton writes: With the passing of Theodore Ambrose one more link between two systems of medical education has been severed. In his generation greater emphasis was laid on clinical observations through one's own senses, for aids, such as modern laboratories provided, were not yet so fully developed. The present methods which substitute to a greater extent instrumental measurements and investigations for impressions based on accumulated

experience may diminish the necessity for the meticulous weighing of evidence gained from the case history and the bedside examination, and, to that extent, permit of quicker but not necessarily more judicious conclusions being arrived at.

In the same period, too, the advance in antiseptics and the treatment of post-operative shock and hæmorrhage have enabled surgeons to undertake operations formerly considered serious risks. With the resources at his command, and well acquainted with the handicaps of the surgery of his day, Theodore Ambrose would never knowingly place the patient's life in jeopardy by advising an operation, however well planned, if he thought the risk was too great, and he, therefore, gained the confidence of a large clientele who felt they could safely leave their surgical fate in his hands. It meant, however, that he saw cases which he considered it unwise to operate on pass elsewhere and be operated on without success, but these events he viewed with the unruffled tolerance which was one of his unfailing virtues.

At the height of his activities he was a master of abdominal surgery with a great respect for living tissues. Although for some years, after a serious cardiac attack, he was unable to practise as formerly, he kept up his interest in surgery, and in spite of his frustration he never complained of his invalidity. He would discuss his growing complications with an apparently complete detachment that forestalled sympathy, and jest had to be met with jest.

He was made for social contacts, but his deafness shut him off from much of the fun and pleasure of conversation which an impish trait in him would supplement, yet the attentions of a devoted wife and family did much to lessen his isolation from the current happenings around him. Whether fortune was smiling or frowning, his imperturbability never failed, and varying fortune on the racecourse as an owner, winning or losing, never changed his happy demeanour.

He undoubtedly has left behind him the pleasantest memories of a completely upright surgeon with an unswerving loyalty to the highest traditions of his profession, and it is good to think that his name will be kept in memory among his fellows as a daughter and a son are practising doctors in this State.

Dr. F. W. Simpson writes: For many years Western Australia's leading surgeon, Dr. Theodore Ambrose died on October 8 at Saint John of God Hospital, Subiaco. He was sixty-seven years of age.

Born in South Australia and educated at the old Way College, Ambrose, like many others of his time, had to go east to take medicine. He graduated at Sydney in 1900. He was for three years a "resident" at Sydney Hospital, acting as pathologist and finally as assistant superintendent. In 1905 he came to the west and set up practice in the then flourishing suburb of Subiaco where he remained until 1915. He then specialized as a surgeon and eventually became senior surgeon to both the Perth and Children's Hospitals.

He was an able and careful surgeon and pioneered many operations in this State. He was an earnest and well read man and extremely courteous to all.

He was greatly interested in horse racing and owned a string of racehorses himself. In 1938 he suffered a coronary occlusion and was extremely ill. He recovered sufficiently to act as ship's surgeon in 1940 on a boat going to England loaded with explosives. In 1941 he went as medical officer to Fanning Island for two years. He then went to America before returning to the west. He would not rest and practised in Brookton, Cue, Meekatharra, Norseman and several other country towns. He was working at Norseman when he became ill again. He was flown to Perth but died the next day.

Surely it could be said of this man that he worked to the end. He left a widow, three sons and four daughters. His sister was a doctor, as are also a son and daughter.

HAROLD ALGAR SWEETAPPLE.

WE are indebted to Dr. D. J. Glissan for the following appreciation of the late Dr. Harold Algar Sweetapple.

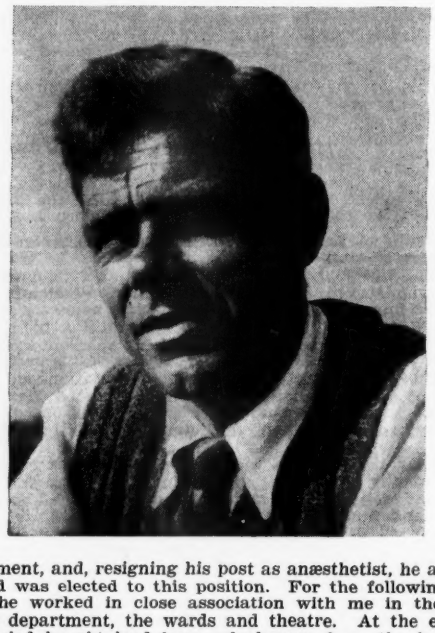
One Friday afternoon about 1929 a stranger walked quietly into the surgeons' dressing room of the old general theatre at Saint Vincent's Hospital, Sydney. He was of medium build, of a compact and neat physique, and there was something about him which suggested the freshness of open spaces on land and on water. His fair complexion set off features cast in a somewhat serious and rugged mould. His manner was quiet and friendly and his face lighted with a pleasant smile as he introduced himself as Dr. Harold Sweetapple, newly appointed honorary anæsthetist to the hospital, reporting for his first day of duty.

This incident was the commencement of some six years of a very close and pleasant association with a man whose qualities and attributes I came to admire very greatly.

Sweetapple had graduated in 1921. He had been an outstanding student during his course, and after periods of residency at the Royal Prince Alfred Hospital, the Royal Hospital for Women and Prince Henry Hospital, he settled into general practice at Rose Bay.

I was to learn that everything he did he did well, and his work as an anæsthetist was admirable. It was soon evident, however, that his interest and keenness extended beyond the duties to which he was appointed to envelop the surgical work with which these associated him. He was a competent craftsman, a good amateur carpenter and an expert boat builder, so that the technical side of orthopædic surgery at once appealed to him.

Chatting one day on the subject of his ambitions, he confessed to a desire to do surgical work and particularly orthopædic surgery. He at once fell in with my suggestion that he should seek appointment as clinical assistant to my



department, and, resigning his post as anæsthetist, he applied for and was elected to this position. For the following two years he worked in close association with me in the outpatient department, the wards and theatre. At the end of this period he obtained leave of absence from the hospital and left for England where he worked for and obtained the Mastership of Orthopædic Surgery of Liverpool University and the Edinburgh Fellowship. He spent three months with Sir Harold Gillies in London and gained a sound insight into plastic surgery which was to serve him well afterwards.

On his return after an absence of two years he was appointed assistant orthopædic surgeon at Saint Vincent's Hospital and shortly afterwards gave up his general work to practise solely as an orthopædic surgeon. He continued to work at Saint Vincent's Hospital for several years until certain arrangements which he had entered into in connexion with his outside practice necessitated his relinquishing his appointment. The severance of this active working relationship was something which I regretted very much.

Sweetapple was a man of the outdoor. He was an excellent golfer, though his deliberation over each of his shots was liable to arouse certain apprehension in his opponent and some impatience in those of his more impetuous club members who happened to be playing behind him.

He had a great love of the sea, and on his voyage to England on a cargo ship he travelled round Cape Horn in mid-winter. His routine on board was very typical of his ordered thoroughness. He dissected for four hours a day in a room on the after deck, did a mile run to warm himself up and spent most of the rest of the time studying navigation and picking up what he could of marine engineering and the technicalities of shipboard wireless.

He built his own boat at his home in Double Bay, the arrangements for the launching of which alone constituted a feat of sound organization.

As a third year medical student he had enlisted for service in the first war, but the Armistice was signed before he could go abroad. The second war found him with his responsibilities greatly increased and his whole life centred devotedly about his home, his wife and his three children. He enlisted for full-time service notwithstanding and served in his capacity as an orthopædic surgeon until after the Armistice.

It was near the close of his army service that he first became aware of the presence of the malady which was finally to overcome him. It was then that he showed the finest of his many fine attributes. His friends will never forget or cease to admire the patient, high courage with which he faced the dire menace of the intractable disease which had marked him down. He worked to the end whilst his strength slowly ebbed and he died with his spirit unconquered.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 2, of January 2, 1948.

AUSTRALIAN MILITARY FORCES.

Australian Army Medical Corps.

To be Temporary Major, 11th July, 1947.—SX34383 Captain N. D. G. Abbott.

SX34383 Captain N. D. G. Abbott is transferred from Australian Army Medical Corps (Medical) Reinforcements, 17th April, 1947 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 132 of 1947, promulgated in *Commonwealth Gazette* No. 188 of 1947).

Reserve of Officers.

Australian Army Medical Corps.

The following officers are transferred to the Reserve of Officers on the dates indicated. Where applicable, they cease to be seconded and relinquish any temporary rank held with effect from the date of transfer to the Reserve of Officers:

No. 113 (Concord) Military Hospital.—TX15486 Captain (Temporary Major) H. B. Murray-Prior, 14th August, 1947, and NX208067 Captain B. C. Mendelsohn, 5th August, 1947.

University Intelligence.

UNIVERSITY OF MELBOURNE.

THE following information has been taken from the *University Gazette* of the University of Melbourne for December 16, 1947.

The Council has tendered its congratulations to Professor F. M. Burnet, Director of the Walter and Eliza Hall Institute, who has been awarded the gold medal of the Royal Society for outstanding biological research. This is the first occasion on which the medal has been awarded to an Australian.

Dr. Ewen Downie, sub-dean of the Alfred Hospital Clinical School, has been appointed Stewart Lecturer in Medicine in 1948.

Professor MacCallum has been reelected Dean of the Faculty of Medicine for 1948. The following members of the teaching staff were nominated members of the Faculty: Dr. Roderick Andrew, Mr. R. Officer, Dr. J. Grieve, Dr. J. Hayden, Dr. Gordon Shaw, Sir Sydney Sewell, Dr. J. K. Adey. The resignation of Mr. Henry Searby was accepted with regret, and with appreciation for his long service as a member of the faculty of medicine.

Professor Hills has been reelected Dean of the Faculty of Science for 1948. With the permanent appointment of a secretary to the Faculty, the position of sub-dean has been abolished.

Dr. Donald Thomson has been reawarded for 1948 a research fellowship in anthropology; some of the fruits of his extensive researches are expected to appear in print in the near future.

In response to a request from the Senate of the University of Sydney, the Council has agreed to sponsor, jointly with the Senate, an archæological expedition to Cyprus from 1950 to 1952.

Hospitals.

THE ROYAL MELBOURNE HOSPITAL.

CENTENARY CELEBRATIONS.

THE Committee of Management of the Royal Melbourne Hospital desires to remind members of the medical profession that in connexion with its centenary celebrations a scientific session will be held at the hospital from March 1 to 10, 1948.

The inaugural address will be given by the Right Honourable R. G. Casey, C.H., D.S.O., M.C., at the Wilson Hall, University of Melbourne, on March 1, 1948, and among those who will give lectures and demonstrations at the hospital will be Sir Hugh Cairns and Dr. William Evans, of London.

The Hospital Committee would be grateful if medical men who intend to be present would notify the manager as soon as possible and state whether they will be accompanied by their wives.

Australian Medical Board Proceedings.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1939 to 1946*, of Queensland, as duly qualified medical practitioners:

Aarons, Morris Vincent, M.B., B.S., 1947 (Univ. Sydney), Mater Misericordiæ Hospital, South Brisbane.

Hilyard-Smith, Royal, M.R.C.S. (England), L.R.C.P. (London), 1940, c.o. Commonwealth Bank, Townsville.

Pringle, Myriel Winifred Beryl, M.B., 1947 (Univ. Sydney), General Hospital, Brisbane.

Taylor, Margaret Regine, M.B., B.S., 1943 (Univ. Sydney), c.o. Dr. C. W. Taylor, Craigdhu, 171, Queen Street, Ayr.

Brand, Sol, M.B., B.S., 1944 (Univ. Melbourne), c.o. Dr. J. A. L. Atkinson, corner of Vulture and Elfin Streets, East Brisbane.

Campbell, Colin Alexander Kemp, M.B., B.S., 1946 (Univ. Sydney), P.O. Box 277, Townsville.

The following additional qualifications have been registered:

Brody, Jancsi, c.o. Commercial Bank of Australasia, Cairns, D.P.H., R.C.P. and S. (England), 1947.

Adam, Geoffrey William Shedden, Women's Hospital, Brisbane, F.R.C.S. (Edinburgh), 1937, F.R.C.O.G. (England), 1945.

Murphy, Alexander Paterson, Ballow Chambers, Wickham Terrace, B17, Brisbane, M.D. (Univ. Sydney), 1947, F.R.A.C.P., 1938.

O'Brien, Richard Alfred, C.B.E., 17, Norman Street, Wooloowin, Brisbane, M.D. (Univ. Melbourne), 1908, D.P.H., R.C.P. and S. (England), 1909.

Medical Prizes.

THE CRAWFORD MOLLISON PRIZE.

To commemorate the great services rendered to medicine in Australia by Dr. Crawford Henry Mollison as a practising pathologist for over fifty years, it is proposed to establish a Crawford Mollison Prize under the following conditions.

1. The establishment of a capital fund of not less than £1000 to be vested in trustees.

2. The prize to be the sum of one hundred guineas to be awarded triennially for the most notable contribution to pathology during that triennial period.

3. The recipient(s) of the prize to be a graduate(s) of the University of Melbourne for work carried out anywhere in the British Empire or graduate(s) of another medical school for work done in the State of Victoria.

4. The prize to be awarded by a committee composed of the trustees of the fund, the Dean of the Faculty of Medicine in the University of Melbourne, the Professor of Pathology in the University of Melbourne, the Professor of Experimental Medicine in the University of Melbourne, the Professor of Obstetrics in the University of Melbourne, and the chairman of the honorary medical staff of the Women's Hospital, Melbourne.

5. The trustees to have the right to require the recipient(s) of the prize to present to the medical profession the work for which the award was made, either by publication or by lecture.

To provide the necessary funds a capital sum of not less than £1000 will be required and a subscription list, to which all Dr. Mollison's former students, colleagues and friends are invited to subscribe, is now open.

The list is headed by a contribution of £250 from the honorary medical staff of the Women's Hospital, Melbourne, and further contributions should be forwarded to the Medical Secretary, British Medical Association (Victorian Branch), 426, Albert Street, East Melbourne, C.2, Victoria, cheques being made payable to the "Mollison Prize Fund".

Medical Appointments.

The undermentioned appointments have been made at the Royal Alexandra Hospital for Children, Camperdown, Sydney: Honorary Physician, Dr. L. F. Dods; Honorary Assistant Physician, Dr. G. C. Geikie; Honorary Relieving Assistant Physician, Dr. D. S. Stuckey; Honorary Assistant Dermatologist, Dr. H. W. R. Sharp; Honorary Relieving Assistant Dermatologist, Dr. R. F. A. Becke; Honorary Surgeons, Dr. J. Steigrad and Dr. E. H. Goulston; Honorary Assistant Surgeons, Dr. D. L. Dey and Dr. C. J. Gibson; Honorary Relieving Assistant Surgeons, Dr. K. J. Fagan and Dr. E. W. Gibson; Honorary Assistant Ophthalmic Surgeon, Dr. R. Hertzberg; Honorary Assistant Orthopædic Surgeon to the Physiotherapy Department, Dr. H. R. T. Hodgkinson.

The undermentioned appointments have been made at the Royal Adelaide Hospital, Adelaide: Resident Medical Officers, Dr. J. B. Bennett, Dr. B. L. Cornish, Dr. H. M. Douglas, Dr. D. B. McLeay and Dr. W. J. Sleeman; Associate Medical Officers, Dr. D. D. Beard, Dr. J. G. Bundey, Dr. E. C. Hallett, Dr. R. G. Painter, Dr. A. D. Phillips and Dr. M. W. Guymer; Assistant Medical Superintendent (Surgical Branch), Dr. J. R. Magarey; Out-Patients' Registrar, Dr. R. A. Russell; Medical Registrar, Dr. R. E. Britten Jones; Surgical Registrar, Dr. L. Bonnin; Resuscitation Registrar, Dr. Gwenyth Sibthorpe; Honorary Gynæcologist, Dr. R. F. Matters; Honorary Assistant Gynæcologist, Dr. R. L. Verco; Honorary Clinical Assistant to the Gynæcological Section, Dr. J. Edis; Honorary Clinical Assistant to the Surgical Section, Dr. G. E. Peters.

Notice.

A LECTURE will be delivered by Sir Charles Bickerton Blackburn in the Union Hall, Sydney University, at 7.45 p.m., on Friday, January 30, 1948, under the auspices of the University of Sydney Medical Society. The subject will be "Cardiac Failure and a Review of Some of the Contributing Factors". All practitioners are cordially invited.

Books Received.

"Illustrations of Regional Anatomy", by E. B. Jamieson, M.D.; Complete Volume, Seven Sections; Seventh Edition; 1947. Edinburgh: E. and S. Livingstone, Limited. 8" x 6", pp. 362, with many coloured illustrations. Price: 75s.

"Good Health with Diabetes", by Ian Murray, M.D., F.R.F.P.S.G., F.R.C.P.E., and Margaret B. Muir, S.R.N.; 1947. Edinburgh: E. and S. Livingstone, Limited. 7¼" x 4¼", pp. 48. Price: 2s.

"The Surgical Clinics of North America" (issued every two months); 1947. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Mayo Clinic Number; 9" x 5¾", pp. 264, with many illustrations.

"A Textbook of Clinical Neurology: With an Introduction to the History of Neurology", by Israel S. Wechsler, M.D.; Sixth Edition; 1947. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¼" x 6", pp. 848, with many illustrations. Price: 59s. 6d.

"Gifford's Textbook of Ophthalmology", by Francis H. Adler, M.D.; Fourth Edition; 1947. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¼" x 6", pp. 526, with many illustrations, some of them coloured. Price: 42s.

Diary for the Month.

JAN. 19.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee Meeting.
JAN. 22.—Victorian Branch, B.M.A.: Executive Meeting.
JAN. 23.—Queensland Branch, B.M.A.: Council Meeting.
JAN. 28.—Victorian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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